



Streaming children into subjects on the basis of genetic testing may not be universally popular.

EDUCATION

Genetics in the schoolroom

Erika Check Hayden ponders a call for schools to embrace genetic information as a priority.

How should the ideal school be designed? A provocative book proposes that we start with genetics. In *G is For Genes*, Robert Plomin, the geneticist who heads the long-running Twins Early Development Study at King's College London, argues that his research is revealing the unfeasibility of all children thriving under 'one-size-fits-all' education regimes. With educational researcher Kathryn Asbury, Plomin lays out the case for a genetically influenced school scheme.

The data from the twin studies, Plomin and Asbury reveal, support the idea that our genes predispose us to excel or to lag behind in particular areas. Education can level the societal playing field by standardizing the learning environment, giving children the chance to

fulfil their genetic potential, but will never enable all children to perform equally well in all subjects. Instead, the authors argue, educators should help each child to reach a basic standard of performance in core areas such as reading and maths. Each child's education could then be personalized so that he or she can develop the skill set favoured by their genes — be that in academic subjects, sport, music or horticulture.

Plomin and Asbury acknowledge that personalizing schools would cost money, but say that teachers could already tailor lessons to a range of skill sets by using computer-based instruction programmed to adapt to students' performance. A school that strives to be sensitive to every child's individuality is the holy grail of most parents. But parents

— and scientists — might look more sceptically on the book's proposal to genotype all children with a "Learning Chip", which would assess the status of genetic markers relevant to learning potential, to gauge how a child's genes might influence their abilities.

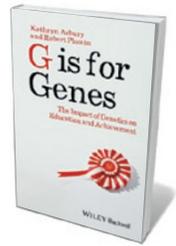
At present, science seems some way off understanding enough about how genes interact with the environment and with each other to predict their influence on complex personality traits, such as an inclination towards maths. Such traits seem to involve many genes, each of which has a small influence, making them difficult to find. The largest-ever study of academic careers, for instance, enlisted 125,000 people, but found only three genetic traits that affect an individual's duration of schooling (a proxy for student achievement) by a few months. And even if such traits are found, predicting how they might influence a student's academic career will be difficult (see C. A. Rietveld *et al. Science* **340**, 1467–1471; 2013).

To be fair, Plomin and Asbury realize that the use of Learning Chips is not possible at the moment, but they seem confident of its future feasibility. However, the central idea of streaming children into certain subject areas on the basis of genetic tests may not find much support.

The authors argue that such tests could be used to identify students who need help to meet basic standards, and to help in the formulation of interventions. Their views are influencing policy: Dominic Cummings, an adviser to British education secretary Michael Gove, once invited Plomin to brief the UK Department for Education on the science of genetics. Cummings caused a firestorm in October with the release of a paper he authored that seemed to favour research into genetics in education.

The study of achievement and intelligence has attracted controversy because it is so often aimed at understanding the make-up and needs of the super-bright, such as students who perform well on standardized tests. They already have a societal advantage. So if it ever becomes feasible to use genes to predict achievement, geneticists such as Plomin face a big task. They will need to present a compelling case that they intend to use genetics for the good of all, not just for the continued advancement of the genetically favoured. ■

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G is For Genes: The Impact of Genetics on Education and Achievement
KATHRYN ASBURY
AND ROBERT PLOMIN
Wiley-Blackwell: 2013.

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