

Submissions Abstract Book - All Papers (All Submissions)

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'Educational Genomics' and Higher Education

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Abstract: This paper reports on the work of the Genomics and Personalisation (GaP) project in relation to the claimed educational implications of recent 'breakthrough' research in the field. Such advances matter greatly because they purportedly foretell educational achievement (Plomin 2018). We focus specifically on Smith-Woolley et al. (2018) and this paper's claims to perform the first genetically sensitive study of university success. We explore the potential implications of such work for policy and practice, as DNA is framed by some as both a means to select 'naturally' strong candidates and a means to 'personalise' learning. Through an invited symposium for social scientists and biological scientists, we probe the evidence base on which findings are reported. More broadly, we contextualise Genomics research by placing it in its wider historical setting and we show how claims to genetic knowledge are established and corroborated in popular discourse.

Paper: Context and Rationale

This paper scopes emerging research findings and critiques public discourses around Genomics, the branch of molecular biology concerned with the organisation, purpose and evolution of genomes. Specifically, our focus is on 'Educational Genomics', an embryonic field that explores how information about the human genome can map traits which are believed to be related to learning. We seek to answer the sensitive and difficult question of whether DNA analysis offers a means to 'personalise' education, drawing on first-hand evidence from those undertaking research in the field and placing recent advances in their historical and ideological context through a systematic, long-range appraisal of Genomics literature.

In popular science, Genomics is increasingly framed as a "fortune teller" (Plomin 2018), and therefore a way of assessing educational suitability at all levels. Much of this literature has focused on genetically sensitive schooling, with the ability to identify "naturally bright kids" (Asbury and Plomin, 2014, p.55) presented as beneficial to both educators and education systems. However, our focus here is on a recent paper by Smith-Woolley et al. (2018) that suggests achievement in Higher

Education is substantially heritable, and that Genomics can explain up to 5% of variance across indicators of university success. One implication of such research is that DNA analysis could help selective universities to choose between candidates. The wider consequences for access and participation – and thus for social justice – are substantial, as are the stakes for individual applicants.

The Genomics and Personalisation project

In response to the thinking outlined above, the authors launched the Genomics and Personalisation (GaP) project to meet the following aims:

1. To systematically review the scientific literature, and the methods through which findings in Genomics are reached;
2. To offer a critical analysis into the ways in which the underlying science base is mediated in popular discourses;
3. To question the predictive accuracy of Educational Genomics and the evidential foundation for advocating 'personalised' learning;
4. To explore the link between Genomics and educational policy, and identify the ways in which genetic knowledge is claimed and represented.

The GaP project facilitates dialogue that researchers in both the biological and social sciences believe necessary. For example, speaking about advances in DNA research, Asbury and Plomin claim that "it's time for educationalists and policy makers to sit down with geneticists to apply these findings to educational practice" (2014, p.3). We address fundamental questions concerning how 'knowledge' is claimed, to whom 'knowers' are accountable, and how science and ideology interact. In the case of Smith-Woolley et al. (2018), we do this by mapping the science upon which the case for DNA predictions of university success rests, and considering the implications for equity of a move towards the 'genetic university'. Our evidence is derived both from empirical work (a symposium for ten geneticists and ten educationalists – see below) and scholarly analysis (of publications in the field of Genomics and their wider impact on public discourses).

Educational Genomics – a new field?

The much-publicised recent scientific 'breakthrough' in the field of Genomics was the genome-wide association study (GWAS) in 2002. More recently, a group of 80 researchers published a paper establishing a link between genes and educational attainment (Lee et al., 2018). The analysis claimed to offer a genetic explanation for 11–13% of the variance in educational attainment and 7–10% of the variance in cognitive performance. Such findings are often amplified by media commentators. For example, Young (2018) argued that for more than fifty years it had been impossible to talk about biological influences on human behaviour without provoking a "hysterical reaction" from the left. To explain why sensitivity is needed, we position such research in its appropriate historical context, revisiting books such as *The Bell Curve* (Murray and Herrnstein, 1994), in which the case is made that human intelligence is determined by both inherited and environmental factors, leading to the emergence of a "cognitive elite". The same authors also wrote about racial differences in intelligence, following earlier research by Jensen (1969), who argued that genetics could explain reported IQ gaps between African Americans and white people. One reason that DNA-based explanations for intelligence are popular is because, as Saini (2018) points out, it has always been useful for the winners in society to find an exogenous basis for their success. What requires investigation is the

extent to which Genomics may be used to reproduce and legitimise a claimed DNA-based meritocracy within (Higher) Education. We are particularly interested in the complicity or otherwise of universities. Our approach – to engage experts from different fields in constructive dialogue and to track systematically the communication of findings to public audience and policymakers – is intended to offer the most even-handed and rigorous evaluation possible.

Methods and Contribution

We present findings that involve direct input from researchers across multiple fields. For example, an invited-participation one-day symposium enables ten genomicists and ten educationalists to undertake structured discussion. The symposium's purpose is bidirectional: educationalists must understand better the science behind the claims; genomicists must connect findings with societal issues including segregation, personalisation and public funding. Our contribution is therefore manifold: to protect opportunities for personal creativity and growth where educational opportunities are at risk of being limited or prescribed by DNA; to offer a critical approach to Genomics research so that findings can be interpreted appropriately and in their rightful context; to address the issues of social justice that arise where Genomics research is used in ways that could legitimise ideologies that reproduce privilege within the Higher Education sector or across society more generally. Our work is original and important because it addresses questions to which universities have grown unaccustomed to facing.

References

Asbury, K., & Plomin, R. (2013). "G is for genes: The impact of genetics on education and achievement". John Wiley & Sons.

Herrnstein, R. J., & Murray, C. (2010). "The Bell Curve". Simon and Schuster.

Lee, J. J., Wedow, R., Okbay, A., Kong, E., Maghzian, O., Zacher, ... & Fontana, M. A. (2018). "Gene discovery and polygenic prediction from a 1.1-million-person GWAS of educational attainment". *Nature Genetics*, 50(8), 1112.

Plomin, R. (2018). "Blueprint: How DNA makes us who we are". MIT Press.

Smith-Woolley, E., Ayorech, Z., Dale, P. S., von Stumm, S., & Plomin, R. (2018). "The genetics of university success". *Scientific Reports*, 8(1), 14579.

Young, T. (2018). "Is Sociogenomics Racist?" Quillette. <https://quillette.com/2018/10/15/is-sociogenomics-racist/>