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Book review: Can socio-genetics be used to promote equality?

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Harden, K. P. (2021). *The Genetic Lottery: Why DNA Matters for Social Equality*. Princeton University Press.

In her book, *The Genetic Lottery – Why DNA Matters for Social Equality*, Kathryn Paige Harden, (2021) provides a comprehensive yet easy-to-read summary of combining genetics and social sciences from its dubious beginnings to the present. Harden is a professor of psychology at the University of Texas and the co-director of the Texas Twin Project. Her expertise is in the genetics of human behaviour in childhood and adolescence. Socio-genetics has been a hot topic for years due to its controversial nature and historical links to eugenics and racism. However, the data and methods utilised in research surrounding socio-genetics are improving. There is more data available, and the quality of that data is improving as the datasets used for genome-wide association studies (GWAS) are getting larger, leading to more accurate polygenic indexes (PGI). We can expect to see more of this kind of research in the future and as such, we need more intelligent discussions about this topic, and Harden's book provides an excellent opportunity to start this discussion.

Harden has divided her book into two parts. The first part discusses the history and results of socio-genetic research and what kinds of research methods have been used. The second part focuses more on what these results really mean and what we should do with them. These parts overlap in many ways, but upon reading the first part, the reader will gain a good idea of the results, different interpretations of them, methods used, and their limitations. All of these make it possible to start the discussion about equality in part two.

Harden explains how the methods used today have been developed, and what we can and cannot achieve with them. For example, some medical conditions are connected to a single gene. However, we do not have one gene, or even a few genes, that are strongly connected to some social outcome, such as education, but we have thousands and thousands of DNA snippets that are weakly connected to said outcome. Harden explains these somewhat complicated concepts using metaphors, such as how a single snippet of DNA can be seen as one ingredient of a dish in a cookbook, and how no single ingredient alone can determine a restaurant's success.

With large datasets including millions of observations, previous studies have been able to identify many of those snippets of DNA that are weakly connected to various social outcomes, conducted through GWAS and PGI. The polygenic index can be seen as an estimate of an individual's genetic predisposition to a social outcome. With GWAS,

it is possible to calculate the polygenic index connected to, for example, education, and Harden points out that PGI captures about 13% of the variance in educational attainment. To clarify whether this is a meaningful connection, Harden writes that altitude captures 12% of the variance in temperatures and height captures 19% of the variance in weight. Therefore, nothing deterministic can be said based on PGI of educational attainment, but it certainly cannot be ignored either.

Harden also explains twin studies, which are another popular way to conduct socio-genetic research in addition to GWAS studies. In twin studies, identical and non-identical twins are compared to assess the genetic connection to, for instance, education. Harden summarises the past fifty years of twin studies by saying that when people inherit different genes, their lives turn out differently. Based on twin studies, as much as 40% of variance in educational attainment is captured by genes. This is quite a lot more than the 13% reported in GWAS studies. Harden states that the truth may lie somewhere in between, as twin studies most likely overestimate the effect of genes while GWAS likely underestimates it. If there was data with even more observations to use in GWAS, we would find even more of those weak connections to different outcomes, increasing the amount of variance captured by PGI. Twin studies may overestimate heritability due to the fact that genes and environments are correlated in ways that are overall difficult to measure and account for. For example, maybe identical twins are treated more similarly by their parents, close family, and school system, than fraternal twins.

Throughout the book, Harden pays attention to themes such as comparing different groups of people, ancestry, and racism; Harden's acknowledgement of these themes is both understandable and welcome. Socio-genetics has a history of racism and eugenics, and these aspects are covered comprehensively in the book. Harden writes that a closer look at the science of genetic ancestry makes it clear that the idea of race does not hold up scientifically. The results we get from socio-genetic studies cannot be generalised to differences between ethnic groups, and modern GWAS and twin studies are not suitable for making comparisons between such groups. Harden also points out that ethnicity and languages do not follow any clear genetic boundaries. She mentions repeatedly that both twin data and GWAS data have been primarily collected amongst people with European ancestry, mainly white people from Europe and the United States. PGI results for educational attainment might be different if the data contained people with other than European ancestry.

Harden creditably presents the problems and possibilities of socio-genetics. Towards the end of the book, she provides in detail various ways of combining social sciences and genetic research to promote equality. In this context, Harden talks about the anti-eugenic programme, which she raises up for public discussion and political debate. One of her five suggestions reads: "Use genetic information to improve opportunity, not classify people." Then she points out that the eugenic way to do research would be to classify people into social roles and positions based on their genetics. A genome-blind approach would be to pretend that all people have an equal likelihood of achieving all social roles or positions accounting for their environment, and finally, an anti-eugenic approach would be to use genetic data to maximise the real capabilities of people to achieve social roles and po-

sitions. I think this way of presenting the main points is very fruitful. She clearly states what approach would be eugenic and what genome-blind interpretation might look like, and then suggests the approach she prefers, which is the anti-eugenic option.

I can recommend Harden's book "The Genetic Lottery – Why DNA Matters for Social Equality" to everyone interested in social sciences and the social significance of genes. The book does not require previous knowledge of the topic, as everything necessary is explained to the reader in plain language and using everyday metaphors. However, it should be noted that some metaphors work better than others. In some cases, restaurant metaphors are successfully simplifying the concepts Harden is explaining, but at times the metaphors themselves remain quite abstract. In terms of social outcomes, the book focuses a lot on education. Including other kinds of social outcomes could have enhanced the message of the book even more. Harden seems to place herself between two different audiences, one of which believes that socio-genetics should be ignored and the other of which believes that genes determine most of people's social status. I think this position is ideal for starting a wider dialogue because Harden manages to talk to multiple audiences in her book. Eugenic and misleading interpretations of studies might still be tempting to some actors in our societies, and we should be able to detect and disprove such claims. I hope we can discuss this theme in a productive and positive way sooner rather than later.

