Philosophy 3334: Philosophy of Biology
Fall 2023
Homework 4

Answers should be uploaded into Blackboard before 11:59pm on Friday, Nov 3rd. [But it will not be marked late until the following Monday].

1) PREAMBLE: In Chapter 1, Harden displays a graph showing the differences in rate of college completion between individuals in the highest and lowest quartiles of family income and between those in the highest and lowest quartiles of a polygenic index score. Later in chapter 4 she says that polygenic scores "typically capture between 10-15% of the variation in out in outcomes like years of schooling, performance on standardized academic tests, or intelligence test scores." Harden claims that family income is an accident of birth beyond the child's control and "A society characterized by equality of opportunity is one in which these accidents of birth do not determine a person's fate in life." She then frames her book in part as an argument that our genes are also due to luck – the genetic lottery – and so we should think of our genetic endowments as morally relevant as well for understanding social inequality as well.

-- After reading the first four chapters hopefully you understand enough about polygenic scores to think about this comparison. Is Harden right that our genetic endowments are relevantly like other accidents? Is she right that this means that we as a society should try to give help to people that need help in order to ensure equal opportunity?

2) In Chapter 7 of Elliott Sober's *The Philosophy of Biology* he uses an example of 'speaking Finnish' vs. 'speaking Korean' to show that there is a fundamental problem with a correlation based definition of what it takes to be a gene for a trait.

> 3a) Explain his example.
> 3b) In chapter 2 of *The Genetic Lottery*, Harden mentions the problem of "population stratification" and uses the example of chopstick use. Explain her example. What if we did a full GWAS study with the phenotype of chopstick use. What do you expect we would find? Is this the same problem that Sober is pointing out or are there important differences in the two cases? Now think about the cases of polygenic scores for college graduation and wealth. Do you think these cases will inherit the same problems? (If so, why do we do these studies at all?) Or if not, what is different about these cases?

3) In chapter 3 of *The Genetic Lottery*, Harden introduces an idea that she calls a cookbook-wide-association-study or CWAS. She suggests different possible ways you might try to measure customer satisfaction (such as Yelp reviews). Imagine you had the time and money to do all of the relevant studies like this. Do you think any of

them would provide you with any useful information about how cooking ingredients are contributing to customer satisfaction? Would this information be helpful if you were trying to predict if a new proposed recipe would taste good or contribute to a restaurant getting good reviews?

Now compare CWAS to GWAS. Do you think that GWAS studies are telling us anything useful? What are the relevant differences? (Or if you think there aren't any, why does Harden seem to think they are different?)