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Introduction

In the summer before my son started kindergarten, my mother, suspicious of the Montessori approach I had taken to his preschool education, offered to help him get ready for what she calls "real" school (the kind with desks). I was fairly confident that his transition to kindergarten would go fine, but I nevertheless seized my chance to go on "real" vacation (the kind without small children). Off my children went to spend two weeks with their grandmother, while I spent two weeks on a beach.

My mother used to be a schoolteacher. A speech pathologist by training, she worked in a semi-rural school district in northern Mississippi, where her students often had serious learning disabilities and were always poor. Now that she's retired, the sunroom in her house in Memphis is decorated with posters scavenged from her old classroom: the ABCs, the US presidents, the world's continents, the Pledge of Allegiance. When I returned from vacation, my children could proudly recite: "I pledge allegiance to the Flag of the United States of America, and to the Republic for which it stands, one Nation under God, indivisible, with liberty and justice for all."

On the poster's laminated surface, my mother had used a purple marker to annotate the text of the Pledge of Allegiance with more

child-friendly words. Above Republic, she wrote "country." Above liberty, she wrote "freedom." Above justice, she wrote, "being fair."

"Being fair" works admirably well as a kindergarten-friendly definition of justice. As any parent who has seen siblings squabble over a toy can attest, children have a keen sense of fairness and unfairness. If tasked with dividing up some colorful erasers to reward other children for cleaning their rooms, elementary school children will throw away an extra eraser rather than give one child an unequal share.[1]

Even monkeys have a sense of fairness. If two capuchin monkeys are "paid" in cucumber slices for performing a simple task, they will both happily pull levers and munch on their cucumber snacks. Start paying just one monkey in grapes, however, and watch the other monkey throw the cucumber back in the experimenter's face with the indignation of Jesus flipping the tables of the moneychangers.[2]

As human adults, we share with our children and our primate cousins an evolved psychology that is instinctively outraged by unfairness. Right now, such outrage is bubbling all around us, threatening to boil over at any moment. In 2019, the three richest billionaires in the US possessed more wealth than the poorest 50 percent of the country.[3] Like capuchin monkeys being paid in cucumbers when their neighbor is being paid in grapes, many of us look at the inequalities in our society and think: "This is unfair."

To the Educated Go the Spoils

Life, of course, is unfair—including how long one's life is. Across many species, from rodents to rabbits to primates, animals who are higher in the pecking order of social hierarchy live longer and healthier lives.[4] In the United States, the richest men live, on average, 15 years longer than the poorest, who have life expectancies at age 40 similar to men in Sudan and Pakistan.[5] In my lab's research, we found that children growing up in low-income families and neighborhoods show epigenetic signs of faster biological aging when they are as young as 8 years old.[6] It might be easier for a camel to pass through the eye of a needle than a rich man to enter the gates of

Heaven, but the rich man has the consolation of being able to forestall judgment day.

These income inequalities are inextricable from inequalities in education. Even before the novel coronavirus pandemic, life spans for White[7] Americans without a college degree were actually getting shorter.[8] This historically unusual decline in life span, unique among high-income countries, was driven by an epidemic of "deaths of despair," including overdoses from opioid drugs, complications from alcoholism, and suicides.[9] The coronavirus pandemic made things worse. In the US, people with a college education are more likely to have jobs that can be done remotely from home, where they are more protected from exposure to a virus—and more protected from layoffs.[10]

In addition to living longer and healthier lives, the educated also make more money. In the past forty years, the top 0.1 percent of Americans have seen their incomes increase by more than 400 percent, but men without a college degree haven't seen any increase in real wages since the 1960s.[11] *The 1960s*. Think about how much has changed since then: We have put a man on the moon; we have fought wars in Vietnam and Kuwait and Afghanistan and Iraq and Yemen; we invented the internet and DNA editing; and in all that time, American men who didn't get past high school haven't gotten a raise.

When economists talk about the relationship between income and education, they use the term "skills premium," which is the ratio of wages for "skilled" workers, meaning ones that have a college degree, to "unskilled" workers, meaning ones who don't. This conception of "skill" leaves out tradespersons, like electricians or plumbers, who can have lengthy and specialized training via apprenticeship rather than college. And anyone who has ever worked an allegedly "unskilled" job like waiting tables will rightly scoff at the idea that such labor doesn't require skill. Working in food service, for instance, involves supplying emotional energy to other people, displaying feelings in the service of how other people feel.[12] The language of "unskilled" vs. "skilled" workers can reflect what the writer

Freddie deBoer has called "the cult of the smart":[13] the tendency to fetishize the skills that are cultivated and selected for in formal education as inherently more valuable than all other skills (e.g., manual dexterity, physical strength, emotional attunement).

In the United States, the magnitude of the "skills premium" in wages has been increasing since the 1970s, and as of 2018, workers with a bachelor's degree earned, on average, 1.7 times the wage of those who had completed only high school.[14] People who lack an even more basic marker of "skill"—a high school diploma—fare even worse. This is not a trivial number of people: The high school graduation rate has barely budged since the 1980s, and about 1 in 4 high school students will not receive a diploma.[15]

The skills premium is about what an individual worker earns in wages. But many people don't work, and many people don't live alone. Differences in the composition of households further exacerbate inequality. Now more than ever, college-educated people marry and mate with other college-educated people, concentrating high earnings potential within a single household.[16] At the same time, rates of solo parenting and total fertility rates are higher for women with less education.[17] In 2016, 59 percent of births to women with only a high school degree were non-marital, compared to 10 percent of births to women with a bachelor's degree or higher. So, non-college-educated women earn less money, have more mouths to feed, and are less likely to have anyone else in the house to help them pull it off.

These social inequalities leave their mark psychologically. People with lower incomes report feeling more worry, stress, and sadness, and less happiness, than people making more money.[18] They are more immiserated by negative events both large (divorce) and small (headache). They even enjoy their weekends less. On the other hand, global life satisfaction—"my life is the best possible life for me"—goes up with income, even among high earners.

Given the myriad ways that people's lives can end up unequal, philosophers have debated which one is the most important: Some consider equality of monetary resources to be the main thing to worry about. Some consider money simply a means to happiness

or well-being. Some refuse to settle on a single currency of justice. Similarly, social scientists tend to study the type of inequality that is the focus of their disciplinary training. For example, economists are particularly likely to study differences in income and wealth, whereas psychologists are more likely to study differences in cognitive abilities and emotions. There is no single best place to start when considering the tangled nest of inequalities between people. But in the US today, whether one is a member of the "haves" or the "have-nots" is increasingly a matter of whether or not one has a college degree. If we can understand why some people go further in school than others do, it will illuminate our understanding of multiple inequalities in people's lives.

Two Lotteries of Birth

People end up with very different levels of education and wealth and health and happiness and life itself. Are these inequalities *fair*? In the pandemic summer of 2020, Jeff Bezos added $13 billion to his fortune in a single day,[19] while 32 percent of US households were unable to make their housing payment.[20] Looking at the juxtaposition, I feel a bubbling disgust; the inequality seems obscene. But opinions differ.

When discussing whether inequalities are fair or unfair, one of the few ideological commitments that Americans broadly claim to share (or at least pay lip service to) is a commitment to the idea of "equality of opportunity." This phrase can have multiple meanings: What, exactly, counts as real "opportunity," and what does it take to make sure it's equalized?[21] But, generally, the idea is that all people, regardless of the circumstances of their birth, should have the same opportunities to lead a long and healthy and satisfying life.

Through the lens of "equality of opportunity," it is not strictly the size or scale of inequalities per se that is evidence that society is unfair. Rather, it is that those inequalities are tied to the social class of a child's parents, or to other circumstances of birth that are beyond the child's control. Whether one is born to rich parents or poor ones, to educated or uneducated ones, to married or unmarried

ones, whether you go home from the hospital to a clean and cohesive neighborhood or a dirty and chaotic one—these are accidents of birth. A society characterized by equality of opportunity is one in which these accidents of birth do not determine a person's fate in life.

From the perspective of equality of opportunity, several statistics about American inequality are damning. On the left side of figure 1.1, I've illustrated one such statistic: how rates of college completion differ by family income. It's a familiar story. In 2018, young adults whose families were in the top quarter of the income distribution were nearly four times more likely to have completed college than those whose families were in the bottom quarter of the income distribution: 62 percent of the richest Americans had a bachelor's degree by age 24, compared with 16 percent of the poorest Americans.

It is important to remember that these data are correlational. We don't know, from this data alone, why families with more money have children who are more likely to complete college, or whether simply giving people more money would cause their children to go further in school.[22]

Yet, in public debates and academic papers about inequality, two things are taken for granted about such statistics. First, data on the relationship between the social and environmental conditions of a child's birth and his or her eventual life outcomes are agreed to be *scientifically useful*. Researchers who hoped to understand patterns of social inequality in a country, but who had no information about the social circumstances into which people were born, would be incredibly hampered. Lifelong careers are devoted to trying to understand *why*, exactly, high-income children go further in school, and trying to design policies and interventions to close income gaps in education.[23] Second, such statistics are agreed to be *morally relevant*. For many people, the distinction they make between inequalities that are fair and those that are unfair is that unfair inequalities are those tied to accidents of birth over which a person has no control, like being born into conditions of privilege or penury.

But there is another accident of birth that is also correlated with inequalities in adult outcomes: not the social conditions into which you are born, but the genes with which you are born.

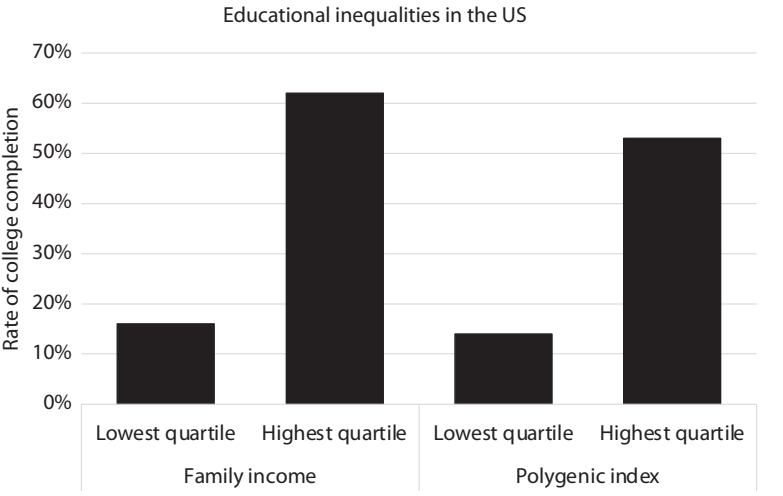

FIGURE 1.1. Inequalities in rates of college completion in the US based on differences in family income versus differences in measured genetics. Data on college completion by income drawn from Margaret W. Cahalan et al., *Indicators of Higher Education Equity in the United States: 2020 Historical Trend Report* (Washington, DC: The Pell Institute for the Study of Opportunity in Higher Education, Council for Opportunity in Education (COE), and Alliance for Higher Education and Democracy of the University of Pennsylvania (PennAHEAD), 2020), https://eric.ed.gov/?id=ED606010. Data on college completion by polygenic index from James J. Lee et al., "Gene Discovery and Polygenic Prediction from a Genome-Wide Association Study of Educational Attainment in 1.1 Million Individuals," *Nature Genetics* 50, no. 8 (August 2018): 1112–21, https://doi.org/10.1038/s41588-018-0147-3; additional analyses courtesy of Robbee Wedow. Polygenic index analyses include only individuals who share genetic ancestry characteristic of people whose recent ancestors all resided in Europe; in the US, these people are very likely to be racially identified as White. The distinction between race and genetic ancestry will be described in more detail in chapter 4.

On the right side of figure 1.1, I have graphed data from a paper in *Nature Genetics*[24], in which researchers created an *education polygenic index* based entirely on which DNA variants people had or didn't have. (I will describe in detail how polygenic indices are calculated in chapter 3.) As we did for family income, we can look at rates of college completion at the lower end versus the upper end of this polygenic index distribution. The story looks much the same: those whose polygenic indices are in the top quarter of the "genetic" distribution were nearly four times more likely to graduate from college than those in the bottom quarter.

The data on family income on the left, despite being correlational, is considered critically important as a starting point for understanding inequality. Social class is recognized as a systemic force that structures who gets more education, and who gets less. The data on family income is also considered by many to be prima facie evidence of unfairness—an inequality that demands to be closed. But what about the data on the right?

In this book, I am going to argue that the data on the right, showing the relationship between measured genes and educational outcomes, is also critically important, both empirically and morally, to understanding social inequality. Like being born to a rich or poor family, being born with a certain set of genetic variants is the outcome of a lottery of birth. You didn't get to pick your parents, and that applies just as much to what they bequeathed you genetically as what they bequeathed you environmentally. And, like social class, the outcome of the genetic lottery is a systemic force that matters for who gets more, and who gets less, of nearly everything we care about in society.

How Genetics Is Perceived

To insist that genetics is, in any way, relevant to understanding education and social inequality is to court disaster. The idea seems dangerous. The idea seems—let's be frank—eugenic. One historian compared scientists who linked genetics with outcomes such as college completion to Germans who were complicit in the Holocaust ("CRISPR's willing executioners").[25] Another colleague once emailed me to say that conducting research on genetics and education made me "no better than being a Holocaust denier." In my experience, many academics hold the conviction that discussing genetic causes of social inequalities is fundamentally a racist, classist, eugenic project.

We also have some insights into how the general public perceives scientists who talk about genetically-caused individual differences—and it's not pretty.

In one social psychology study, participants were asked to read a story about a fictional scientist, Dr. Karlsson.[26] There were two

versions of the vignette. In both, the fictional Dr. Karlsson's research program and scientific methods were described in *exactly* the same way. What differed was Dr. Karlsson's results: In one version, participants read that Dr. Karlsson found that genetic causes were weakly associated with performance on a math ability test, accounting for about 4 percent of the variation between people. In the other version, genetic influences were stronger, accounting for 26 percent.

After reading about these research findings, participants were asked how likely it was that Dr. Karlsson would agree with five statements:

1. People's status in society *should* correspond with their natural ability.
2. I believe people and social groups *should* be treated equally, independently of ability.
3. Some people *should* be treated as superior to others, given their hard-wired talent.
4. It's *OK* if society allows some people to have more power and success than others—it's the law of nature.
5. Society *should* strive to level the playing field, to make things just.

These statements were intended to measure "egalitarian" values. The Merriam-Webster definition of *egalitarianism* is "a belief in human equality especially with respect to social, political, and economic affairs; a social philosophy advocating the removal of inequalities among people." When participants read that Dr. Karlsson found evidence for stronger genetic causes of math ability, they perceived him as having less-egalitarian values—as wanting to treat some people as superior to others, as being uninterested in making society more just, as not believing that people should be treated equally.

Furthermore, this study found that a scientist who reported genetic influence on intelligence was also perceived as less objective, more motivated to prove a particular hypothesis, and more likely to hold non-egalitarian beliefs that predated their scientific research career. People who described themselves as politically conservative doubted scientists' objectivity across the board, regardless of the scientists' findings, but people who described themselves as politically

liberal were particularly likely to doubt the scientist's objectivity when she reported genetic influences on intelligence.

This study is important because the participants were not scientists or academics with any particular expertise in genetics or mathematics or political philosophy. They were college undergraduates fulfilling a course requirement, or people working from home who wanted to earn some extra money by filling out surveys. The study speaks to how common it is for people, particularly when they have liberal political ideologies, to see empirical statements about how genes *do* influence human behavior as incompatible with moral beliefs about how people *should* be treated equally.

The Enduring Legacy of Eugenics

There are, of course, good reasons why many people perceive genetic findings to be incompatible with social equality. For over 150 years, the science of human heredity has been used to advance racist and classist ideologies, with horrific consequences for people classified as "inferior."

In 1869, Francis Galton—cousin of Charles Darwin and coiner of the term "eugenics"—published his book *Hereditary Genius*.[27] Essentially consisting of hundreds of pages of genealogies, Galton's book aimed to demonstrate that British class structure was generated by the biological inheritance of "eminence." Men with great professional achievements in science, business, and the law descended from other great men. *Hereditary Genius*, along with Galton's subsequent 1889 book *Natural Inheritance,*[28] reframed the study of "heredity" as the study of measurable similarities between relatives[29]—a scientific approach that continues today, including in many of the studies I will describe in this book.

Galton, however, wasn't content merely to document familial resemblance in the form of pedigree tables; he wanted to *quantify*—put a number on—that resemblance. Indeed, quantification was his most enduring enthusiasm; "whenever you can, count" was his slogan.[30] In seeking a mathematical representation of familial resemblance, Galton invented foundational statistical concepts, like the

correlation coefficient. But alongside his statistical developments, he also speculated about how heredity could and should be manipulated in humans. In a footnote published in 1883, Galton introduced the new word "eugenics" to "express the science of improving stock," the aim of which was "to give to more suitable races or strains of blood a better chance of prevailing speedily over the less suitable."[31] From the very beginning, then, the nascent science of statistics, and the application of statistics to study patterns of familial resemblance, were entangled with beliefs about racial superiority and with proposals to intervene in human reproduction for the goal of species betterment.

When he died in 1911, Galton bequeathed money to University College London for a Galton Eugenics Professorship, a position that was given to his protégé, Karl Pearson, who was also the head of the newly created Department of Applied Statistics.[32] In his role, Pearson continued to make foundational contributions to statistical methods that are now routinely used in every branch of science and medicine. His research activities were cloaked in a language of neutrality: "We of the Galton laboratory have no axes to grind. We gain nothing, and we lose nothing, by the establishment of the truth." Yet Pearson's political agenda was anything but neutral. Brandishing statistics about familial correlations for "mental characteristics" (such as teacher ratings of academic ability), Pearson argued that progressive-era social reforms, like the expansion of education, were useless. He also opposed labor protections, such as prohibitions on child labor, the minimum wage, and the eight-hour workday, on the grounds that these reforms encouraged reproduction among "incapables."[33]

In the United States, Galton and Pearson's enthusiasm for quantitative studies of family pedigree data was mirrored in the work of Charles B. Davenport, who established a Eugenics Record Office at Cold Spring Harbor on Long Island, New York. In 1910, Davenport appointed Harry H. Laughlin as the Office's superintendent, thus empowering perhaps the most effective proponent of eugenic legislation in American history.

Almost immediately after beginning his post, Laughlin began research for his book, *Eugenical Sterilization in the United States*,[34]

which was eventually published in 1922. Citing legal precedents such as compulsory vaccination and quarantine, Laughlin's book argued in support of "the right of the state to limit human reproduction in the interests of race betterment." The book culminated in text for a "Model Eugenical Sterilization Law," to be adapted by state legislatures interested in preventing "the procreation of persons socially inadequate from defective inheritance." "Socially inadequate" persons were defined as anyone who "fails chronically . . . to maintain himself or herself as a useful member of the organized social life of the state," as well as the "feeble-minded," insane, criminally delinquent, epileptic, alcoholic, syphilitic, blind, deaf, crippled, orphaned, homeless, and "tramps and paupers." In 1924, the state of Virginia passed a Sterilization Act that used language directly from Laughlin's model law.[35]

Eugenicists eager to establish the constitutionality of Virginia's Eugenical Sterilization Act quickly found an ideal test case in Carrie Buck, whose own mother, Emma, had syphilis, and who had given birth to a daughter, Vivian, while unmarried, after being raped by her foster parent's nephew.[36] Writing for the majority in *Buck v. Bell*, Supreme Court justice Oliver Wendell Holmes upheld the Virginia statute with an infamous pronouncement on the Buck family: "Three generations of imbeciles is enough." After the *Buck v. Bell* decision, and continuing until 1972, more than 8,000 Virginians were sterilized, and around 60,000 Americans were sterilized as other states followed Virginia's example.[37]

Still, the pace of sterilization was too slow to satisfy the most zealous proponents of eugenics. When Germany passed its own version of Laughlin's model law, soon after Hitler gained power in 1933, American eugenicists urged the expansion of sterilization programs here. "The Germans are beating us at our own game," bemoaned Joseph DeJarnette, a plantation-born son of the Confederacy, who had testified against Carrie Buck in *Buck v. Bell* and who oversaw over 1,000 sterilizations as the director of Western State Hospital in Staunton, Virginia.[38]

In 1935, the Nazi government passed the Nuremberg Laws, prohibiting marriage between Jews and non-Jewish Germans, and

stripping Jews, Roma, and other groups of legal rights and citizenship. That year, Laughlin wrote to his Nazi colleague, Eugen Fischer, whose work on the "problem of miscegenation" had provided an ideological foundation for the Nuremberg Laws.[39] The goal of Laughlin's letter to Fischer was to introduce him to Wickliffe Preston Draper, a textile magnate and eugenics enthusiast who would be soon traveling to Berlin to attend a Nazi conference on "race hygiene."[40]

Upon his return to the US, Draper worked with Laughlin to establish the Pioneer Fund, which was incorporated in 1937 and still exists today. Named in honor of the "pioneer" families who originally settled the American colonies, the fund aimed to promote research on human heredity and "the problems of race betterment." One of its first activities was to distribute a Nazi propaganda film on sterilization, *Erbkrank,* which had received special acknowledgment from Hitler himself.[41]

We can draw a direct line, both financially and ideologically, from these eugenicists of the early twentieth century to the white supremacists of today. Consider, for example, Jared Taylor, a self-described "race realist" who thinks that Black Americans are incapable of "any sort of civilization"—and a recent recipient of Pioneer Fund money.[42] Continuing in the ideological tradition of Pearson and Laughlin, Taylor embraces genetics as a rhetorical weapon against the goals of social and political equality. His review of *Blueprint*, a book by the behavioral geneticist Robert Plomin (whose work I will describe in this book), proclaimed that new developments in genetics would sound the death knell for social justice: "if [these] scientific findings were broadly accepted, they would destroy the basis for the entire egalitarian enterprise of the last 60 or so years."[43]

In 2017, white supremacists converged in Charlottesville for the "Unite the Right" rally.[44] Men in khakis waved swastika flags and chanted "Jews will not replace us" as they marched through the town where Carrie Buck is buried—a grim reminder that the demented ideology of "racial purity" connecting Jim Crow Virginia and Nazi Germany, an ideology that also had grisly consequences for poor Whites like Buck, has never fully gone away.

Genetics and Egalitarianism: A Preview

In the century and a half since the publication of *Hereditary Genius*, geneticists have identified the physical substance of heredity, discovered the double-helix structure of DNA, cloned a sheep, sequenced the genomes of anatomically modern humans and of Neanderthals, created three-parent embryos, and pioneered CRISPR-Cas9 technology to edit the DNA code directly. Yet, in all that time, how people make sense of the relationship between genetic differences and social inequalities has barely budged from Galton's original formulation: empirical claims ("people differ genetically, which causes physical, psychological, and behavioral differences") are mixed together with moral oughts ("some people should be treated as superior to others"), with potentially horrible consequences.

What I am aiming to do in this book is re-envision the relationship between genetic science and equality. Can we peel apart human behavioral genetics, beginning with Galton's observations and continuing to modern genetic studies of intelligence and educational attainment, from the racist, classist, and eugenicist ideologies it has been entwined with for decades? Can we imagine a new synthesis? And can this new synthesis broaden our understanding of what equality looks like and how to achieve it?

To begin to convey how we can reimagine the relationship between genetics and egalitarianism, it will help here to describe where I diverge from a book in the Galtonian tradition—*The Bell Curve*, by Richard Herrnstein and Charles Murray.[45] The title of *The Bell Curve* is a nod to Galton's statistical preoccupation, the observation that plotting the population frequency of different values of human traits results in a bell-shaped "normal" distribution with particular mathematical properties. The subtitle (*Intelligence and Class Structure in American Life*) is a nod to Galton's social preoccupation, the question of how class differences reflected genetic inheritance.

Instead of "eminence," Herrnstein and Murray focused on intelligence, as measured by standardized tests of abstract reasoning skills. Like Herrnstein and Murray (and like the vast majority of psychological scientists), I also believe that intelligence tests measure an

aspect of a person's psychology that is relevant for their success in contemporary educational systems and labor markets, that twin studies tell us something meaningful about the genetic causes of individual differences between people, and that intelligence is heritable (a terribly misunderstood concept that I will explain in detail in chapter 6). Given these similarities, comparisons between this book and *The Bell Curve*, along with Herrnstein's earlier 1973 book on IQ and meritocracy,[46] are unavoidable. Briefly enumerating the differences between us here, therefore, has the advantage not just of pre-empting misunderstandings but also of foreshadowing the arguments I will advance throughout this book.

Here, I will argue that the science of human individual differences is entirely compatible with a full-throated egalitarianism. The final section of *The Bell Curve* flirts with the idea that genetics could be used to bolster egalitarian arguments for greater economic equality: "Why should [someone] be penalized in his income and social status? . . . We could grant that it is a matter not of just deserts but of economic pragmatism about how to produce compensating benefits for the least advantaged members of society."

There are two big ideas crammed into these few sentences: (1) that people do not *deserve* economic disadvantages simply because they happened to inherit a particular combination of DNA, and (2) that society should be organized so that it benefits the least advantaged members of society. It's disorienting to come across these ideas in *The Bell Curve*, because they sound like they come straight out of a very different book: *A Theory of Justice*, by the egalitarian political philosopher John Rawls.

In *A Theory of Justice,* Rawls used the metaphor of the "natural lottery" to describe how people differ in their initial positions in life. As I'll describe in chapter 2, a lottery is a perfect metaphor for describing genetic inheritance: the genome of every person is the outcome of nature's Powerball.

Rawls then devotes several hundred pages to considering how a just society should be arranged, given that people do differ in the outcome of two lotteries of birth, the natural and the social. Far from seeing differences between people in their "natural abilities"

as justifying inequalities, Rawls decried the injustice of societies that were structured according to the "arbitrariness found in nature." His principles of justice led him to argue that inequalities that stemmed from the natural lottery were acceptable only if they worked to the benefit of the least advantaged in society. In Rawls's view, taking biological differences between people seriously did not undermine the case for egalitarianism; it was part of the reasoning that led to him to advocate for a *more* equal society.

The Bell Curve, with its fleeting reference to Rawlsian ideas, pointed faintly at a new way of talking about genetics and social equality. But after their tantalizing half-page dalliance with egalitarianism, Herrnstein and Murray retreat to a profound *in*egalitarianism, complaining that "it has become objectionable to say that some people are *superior* to other people. . . . We are comfortable with the idea that some things are *better* than others—not just according to our subjective point of view but according to enduring standards of merit and *inferiority*" (emphasis added). After 500 pages, it's clear what sort of things—and what type of people—they consider better. According to them, to score higher on IQ tests is to be superior; to be White is to be superior; to be higher class is to be superior. Indeed, they describe economic productivity ("putting more into the world than [one] take[s] out") as "basic to human dignity."

Compare their slick confidence that some people are superior to other people with the definition of inegalitarianism provided by the political philosopher Elizabeth Anderson:[47]

> Inegalitarianism asserted the justice or necessity of basing social order on a hierarchy of human beings, ranked according to intrinsic worth. Inequality referred not so much to distributions of goods as to relations between superior and inferior persons. . . . Such unequal social relations generate, and were thought to justify, inequalities in the distribution of freedoms, resources, and welfare. This is the core of inegalitarian ideologies of racism, sexism, nationalism, caste, class, and eugenics.

In other words, eugenic ideology asserts that there is a hierarchy of superior and inferior human beings, where one's DNA determines

one's intrinsic worth and rank in the hierarchy. The social, political, and economic inequalities that proceed from this hierarchy—where the superior get more, and the inferior get less—are, according to eugenic thought, inevitable, natural, just, and necessary.

The standard rejoinder to eugenic ideology has been to emphasize people's genetic sameness. After all, differences between people in their DNA cannot be used to determine their worth and rank if there are no differences. This rhetoric, linking political and economic equality to genetic similarity, is clearly evident in how President Bill Clinton announced that the Human Genome Project had completed its first complete rough draft of the sequence of human DNA.[48] He trumpeted the genetic sameness of humans as an empirical truth that buttressed an egalitarian ideal:

> All of us are created equal, entitled to equal treatment under the law. . . . I believe one of the great truths to emerge from this triumphant expedition inside the human genome is that in genetic terms, all human beings, regardless of race, are more than 99.9 percent the same.

As Clinton said on a different occasion, "mistakes were made," and tying genetic sameness to egalitarian ideals was, I believe, one of Clinton's mistakes. Yes, the genetic differences between any two people are tiny when compared to the long stretches of DNA coiled in every human cell. But these differences loom large when trying to understand why, for example, one child has autism and another doesn't; why one is deaf and another hearing; and—as I will describe in this book—why one child will struggle with school and another will not. Genetic differences between us matter for our lives. They *cause* differences in things we care about. Building a commitment to egalitarianism on our genetic uniformity is building a house on sand.

The biologist J.B.S. Haldane compared Karl Pearson to Christopher Columbus: "His theory of heredity was incorrect in some fundamental respects. So was Columbus's theory of geography. He set out for China, and discovered America."[49] The comparison of Columbus with Pearson and his fellow eugenicists is the right one,

I think. They are similar in the enormity of their theoretical incorrectness, in the enormity of the violence and harm they brought to innocent people—and in the enormousness of what they discovered. Knowing what we know now, we cannot pretend that the continent of America does not exist. Knowing what we know now, we cannot pretend that genetics do not matter. Instead, we must carefully scrape away the eugenicists' scientific and ideological errors, and we must articulate how the science of heredity can be understood in an egalitarian framework.

In this book, I will argue that it is not eugenic to say that people differ genetically. Nor is it eugenic to say that genetic differences between people cause some people to develop certain skills and functionings more easily. Nor is it eugenic for social scientists to document the ways in which educational systems and labor markets and financial markets reward people, financially and otherwise, for a particular, historically and culturally contingent set of genetically influenced talents and abilities. What *is* eugenic is attaching notions of inherent inferiority and superiority, of a hierarchical ranking or natural order of humans, to human individual differences, and to the inheritance of genetic variants that shape these individual differences. What *is* eugenic is developing and implementing policies that create or entrench inequalities between people in their resources, freedoms, and welfare on the basis of a morally arbitrary distribution of genetic variants.

The anti-eugenic project, then, is to (1) understand the role that genetic luck plays in shaping our bodies and brains, (2) document how our current educational systems and labor markets and financial markets reward people with certain types of bodies and brains (but not other types of brains and bodies), and (3) reimagine how those systems could be transformed to the inclusion of everyone, regardless of the outcome of the genetic lottery. As the philosopher Roberto Mangabeira Unger wrote, "Society is made and imagined . . . it is a human artifact rather than the expression of an underlying natural order."[50] This book views the understanding of the natural world, in the form of genetics, as an ally rather than an enemy in the remaking and reimagining of society.

Why We Need a New Synthesis

That genetics would be useful at all for advancing the goals of social equality is a claim that is frequently met with skepticism. The potential dangers of eugenics loom large in the imagination. The potential benefits of connecting genetics to social inequalities, on the other hand, might seem slim. Even if a new synthesis of genetics and egalitarianism is possible, why take the risk? Given the dark legacy of eugenics in America, it might feel overly optimistic, even naïve, to imagine that genetic research could ever be understood and used in a new way.

What is missing from this consideration of risks and benefits, however, are the risks of continuing the status quo, where understanding how genetic differences between individuals shape social inequalities is widely considered, by both academics and the lay public, to be taboo. This status quo is no longer tenable.

As I will explain in chapter 9, the widespread tendency to ignore the existence of genetic differences between people has hobbled scientific progress in psychology, education, and other branches of the social sciences.[51] As a result, we have been much less successful at understanding human development and at intervening to improve human lives than we could be. There is not an infinite supply of political will and resources to spend on improving people's lives; there is no time and money to waste on solutions that won't work. As the sociologist Susan Mayer said, "if you want to help [people], you have to *really* know what help they need. You can't just think you have the solution"[52] (emphasis added). If social scientists are collectively going to rise to the challenge of improving people's lives, we cannot afford to ignore a fundamental fact about human nature: that people are not born the same.

Ignoring genetic differences between people also leaves an interpretive vacuum that political extremists are all too happy to fill. Jared Taylor is not the only extremist to retain an interest in genetics. As the geneticists Jedidiah Carlson and Kelley Harris summarized, "members and affiliates of white nationalist movements are voracious consumers of scientific research."[53] Both journalists and

scientists have sounded the alarm about how genetics research was dissected on white supremacist websites like Stormfront (motto: "White Pride Worldwide"),[54] but Carlson and Harris were able to put hard numbers on the phenomenon by analyzing data on how social media users shared working papers that scientists had posted to *bioRxiv.* Their analysis showed that papers on genetics are particularly popular among white nationalists.

I've seen this phenomenon play out with my own work. Take, for example, a paper I co-authored on how genetic differences are related to what economists have called "non-cognitive skills" related to success in formal education. (I'll explain this paper in more detail in chapter 7).[55] Carlson and Harris's analysis found that five out of six of the biggest Twitter audiences for our paper were people who appeared, from the terms used in their bios and usernames, to be academics in psychology, economics, sociology, genomics, and medicine (figure 1.2). The sixth audience, though, comprised Twitter users whose bios included terms like "white," "nationalist," and the green frog emoji, an image that can be used as a hate symbol in anti-Semitic and white supremacist communities.[56]

This is a dangerous phenomenon. We are living in a golden age of genetic research, with new technologies permitting the easy collection of genetic data from millions upon millions of people and the rapid development of new statistical methodologies for analyzing it. But it is not enough to just produce new genetic knowledge. As this research leaves the ivory tower and disseminates through the public, it is essential for scientists and the public to grapple with what this research *means* about human identity and equality. Far too often, however, this essential task of meaning-making is being abdicated to the most extreme and hate-filled voices. As Eric Turkheimer, Dick Nisbett, and I warned:[57]

> If people with progressive political values, who reject claims of genetic determinism and pseudoscientific racialist speculation, abdicate their responsibility to engage with the science of human abilities and the genetics of human behavior, the field will come to be dominated by those who do not share those values.

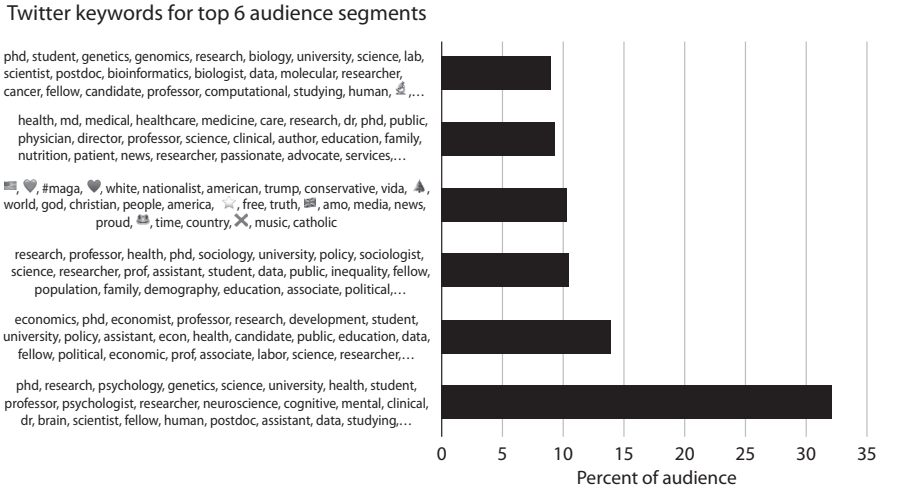

FIGURE 1.2. Top 6 largest social media audiences for scientific paper on genetics and noncognitive skills. Audience analysis methods reported in Jedidiah Carlson and Kelley Harris, "Quantifying and Contextualizing the Impact of bioRxiv Preprints through Automated Social Media Audience Segmentation," *PLOS Biology* 18, no. 9 (September 22, 2020): e3000860, https://doi.org/10.1371/journal.pbio.3000860. Audiences are presented for preprint of Perline Demange et al., "Investigating the Genetic Architecture of Noncognitive Skills Using GWAS-by-Subtraction," *Nature Genetics* 53, no. 1 (January 2021): 35–44, https://doi.org/10.1038/s41588-020-00754-2.

The Goals of This Book

What, then, *does* the science of human abilities and the genetics of human behavior mean for social equality? To address the question, this book proceeds in two general parts. In the first part, I hope to convince you that genetics do, in fact, matter for understanding social inequality. Common counter-arguments to the idea that genetics matter include the ideas that twin studies are hopelessly flawed, that heritability estimates are useless, that associations with measured DNA are just correlations but don't provide any evidence that genes are causal, or that genes might be causal but it doesn't matter if they are if we don't know the mechanism. All of these ideas falter under closer examination, but in order to explain why, it will be necessary to dive into some methodological details of how behavioral

genetics research is done, and into some philosophy of science about what those methods are accomplishing.

In chapter 2, I begin by explaining my metaphor of the genetic lottery in more detail, bringing in some biological and statistical concepts, such as genetic recombination, polygenic inheritance, and the normal distribution. Here, and throughout the book, I focus on genetic differences between people that occur because of *chance*, i.e., through the natural lottery of genetic inheritance, rather than because of *choice*, such as through pre-implantation genetic diagnosis or other reproductive technologies.[58]

Next, in chapter 3, I explain common methods for testing how genetic differences between people are associated with differences in their life outcomes, in particular genome-wide association studies and polygenic index studies. Chapter 4 then explains why the results of genome-wide association studies cannot tell us about the causes of *group* differences, particularly differences between racial groups. The unceasing parade of books and articles about "innate" racial differences have been sound and fury signifying nothing. Rather, genetic research on social inequalities, both twin research and research with measured DNA, has focused almost entirely on understanding *individual* differences among people whose recent genetic ancestry is exclusively European[59] and who are overwhelmingly likely to identify as White.

This narrowing of scope provides an essential qualification for all of the empirical results that I describe in the book. Genetic research on social and behavioral phenotypes, with its current focus on people of European genetic ancestry, cannot meaningfully inform our *scientific* understanding of social inequalities between racial and ethnic groups. However, as I describe in chapter 4, our consideration of why people return, time and time again, to the scientifically empty question of genetic racial differences reveals how genetic explanations are used to waive people's social responsibility for enacting change. Considering genetics as an absolution for social responsibility is a false pretext that must be dismantled, regardless of how genes are distributed within or between socially constructed racial groups.

With the distinction between group differences and individual differences in mind, chapter 5 begins to address an essential question about the results of genome-wide association studies and polygenic index studies: Are these studies telling us about genetic *causes*? In order to address this question, I step back and address a more general question first, which is, "What makes something a cause?" Chapter 6 applies this clarity regarding what a cause is (and what it isn't) to understanding the results of genome-wide association studies and heritability studies. Here, too, I review the wealth of evidence showing that genes cause important life outcomes, including educational attainment. Chapter 7 concludes the first half of the book by describing what we know about the mechanisms linking genes and education.

In the second half of the book, I consider what we should do with the knowledge that genetics matter for understanding social inequality. Once we throw away the eugenic formulation that genetic differences form the basis of a hierarchy of innately superior and inferior humans, what is left? In chapters 8 and 9, I consider how understanding genetic differences between people can improve our efforts to change the world through social policy and intervention. In chapter 10, I consider why people are motivated to reject information about genetic causes of human behavior, and how considering genes as a source of luck in people's lives might actually reduce the blame that is heaped on the heads of people who have been "unsuccessful" educationally and economically. In chapter 11, I consider why genetic influences on intelligence test scores and educational outcomes, in particular, are difficult to peel apart from notions of human inferiority and superiority, and compare how we view genetic research on these aspects of human psychology with how we view genetic research on other traits, such as deafness or autism. Finally, in chapter 12, I describe five principles for anti-eugenic science and policy.

Throughout the book, I will not attempt to hide my own left-leaning political sympathies. But my earnest hope is that even readers with politics very different from mine will be convinced that the questions I ponder here are important, even if you vehemently

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