How Troubling Is Our Inheritance? A Review of Genetics and Race in the Social Sciences

By
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This article addresses the argument that there is variation between races in the biological basis for social behavior. The article uses Nicholas Wade's popular book, *A Troublesome Inheritance*, as the point of departure for a discussion of attendant issues, including the extent to which human races can be definitively demarcated biologically, the extent to which genetics is related to contemporary definitions of race, and the role of natural selection as a possible mechanism for change in modern societies. My critical review of the theory and evidence for an evolutionary view of racial determinism finds that genetics does not explain the relative status and well-being of today's racially identified groups or their broader societies.

Keywords: race; racism; evolution; genetics

Most social scientists who study race discount the possibility that racial biology plays a major role in the determination of social behavior and inequality. However, the foundation for this consensus may be weak. There is no firm evidence to support the importance of racial biology, and the notion is widely associated with racism, which makes the question of whether racial biology influences social behavior and inequality seem both tangential and tainted by stigma. This, along with their (our) lack of training in and interaction with biological sciences, presumably discourages social scientists from concerning themselves with the

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NOTE: Under rule 8.39 in the 16th edition of the Chicago Manual of Style, authors may express a preference for capitalizing the terms "Black" and "White," which this journal normally does not capitalize. In this case, the author's preference reflects the belief that these terms more closely describe ethnic or national-origin group identities (like Asian Americans or Latinos) than biological races or skin colors.

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biology of race. One consequence of this avoidance is that the field is thin and relatively open. As genomic science progresses, it creates opportunities for discovery and exploration, but also for misappropriation and manipulation by scientific racists (Ossorio and Duster 2005). In this article I address a question that frames this issue, namely, Is there variation between races in the biological basis for social behavior? After outlining my perspective in the introduction, I explore one approach, that of science writer Nicholas Wade in his 2014 book, *A Troublesome Inheritance: Genes, Race and Human History*. I conclude with some implications of this approach for social science research.[1]

Introduction

To conclude that there is racial variation in the biological basis for social behavior requires affirming three antecedents: (1) there is a biological (or genetic) basis for social behavior, (2) the genes controlling or contributing to such behavior are selected by natural selection and vary across human populations, and (3) those human populations correspond to common social conceptions of race. I introduce each of these points briefly before exploring them further in the next section.

The first of these statements is obviously true to some degree, but we do not know the precise mechanisms for such influence. We do not know the extent to which behavior patterns are genetically versus socially evolved and how exactly genetics interact with environmental factors to influence individual behavior. Target behaviors—ranging from marriage to addiction to violence—are highly complex and variable, codetermined by social interaction and environmental factors in addition to possible genetic effects (D'Onofrio and Lahey 2010). Feedback effects are common but difficult to quantify and involve biological dynamics that are not simply genetic; one example is testosterone, which affects behaviors and interactions in ways that also affect testosterone levels (Booth et al. 2006). A generic behavioral trait such as cooperation clearly was essential for the development of human society. But we do not know whether a specific genetic basis for cooperation evolved, rather than, say, a more general cognitive capacity to learn the value of cooperation and transmit it culturally. It is safe to assume that the more complex (and interesting) the behavior in question, the further we are from understanding its evolutionary origin.

Because of uncertainty with regard to the first statement, we cannot fully evaluate the veracity of the second statement—that natural selection drives behavioral genetic differences between contemporary human populations. At our level of understanding of the relationship between genetics and behavior, we cannot tell the difference between biological versus cultural origins of patterned variation across human populations. However, I favor a presumption of social versus biological causality to explain these patterns, based on the known impact of social and environmental factors on group behavior versus our lack of evidence for genetic causes. But it is also a political judgment, because the implications of

incorrectly believing the reverse—that genetics do determine behavioral differences between human populations—are potentially dire. That does not mean I am prejudging future scientific conclusions, but rather, I am acknowledging the place of political (moral) implications in our interpretation of existing knowledge.

In our justice system the presumption of innocence does not imply surrendering our capacity to openly evaluate all the evidence; rather, it acknowledges the consequences of different kinds of error in that evaluation. Similarly, the risks we take in medical research are weighed against the gains to be had from the innovations under study. In evaluating the case for racial genetics determining social behavior, the consequence of falsely coming down on the side of race is very bad, so I set the evidentiary bar high for that conclusion. Although there is growing appreciation for genetic research in mainstream social science, race provides a special case of the potential social harms such research can inflict, where—as we will see—"the potential for pernicious naïveté about genetics is especially high" (Freese 2008, S4).

With regard to the third statement—that diverse human populations are "races"—I discuss some of the evidence below. However, the research from population genetics and evolutionary biology in this area is mostly not concerned with modern behavioral questions but rather with issues such as the history of human geography, disease adaptation, and the mechanisms of evolution. Thus, I stress at the outset that the importance of identifying or defining race and races is related to the interpretation of the previous statements on behavior and genetics. If genetics do not determine group differences in social behavior, then the definitions we employ and the labels we apply to those groups become less important, at least for the social science of inequality between groups.

Genetics, Evolution, and Behavior

In the words of Charles Murray (2014), the publication of *A Troublesome Inheritance*, by Nicholas Wade (2014a), will "trigger an intellectual explosion the likes of which we haven't seen for a few decades."[2] If the denunciation of the book by more than a hundred population geneticists and evolutionary biologists (Coop et al. 2014) is any indication, that explosion may be more political than intellectual. The book is an attempt to rebrand scientific racism under contemporary genomic science. I introduce it here both as a vehicle for exploring the overarching questions above and as a cautionary illustration of where such questions may lead in the current climate. Not every social scientist interested in the genetics of racial differences in behavior deserves to be tarred with the brush I apply here, but they do have to grapple with the problems people like Wade cause. To take seriously the notion of racial biology as a determinant of worldwide social inequality, one would need a set of building blocks more or less like Wade's, even if with different details.

Wade, a longtime science journalist for the *New York Times*, argues that evolution by natural selection created human races with different genetic predispositions for social behavior, continuing to the present day. As races evolved, following divergent migrations out of Africa, their social behavior diverged and became written in their genes. This fueled the development of disparate societal institutions, leading to contemporary inequalities between rich and poor countries according to their adaptability to modern economic imperatives. Thus, Wade argues that the Caucasian and East Asian races constitute the richest and most powerful nations in the world because they are genetically better adapted to success in modern capitalist systems than are Africans and the other racial groups, who remain steeped in tribalism, the "default" human condition.

Wade believes that science gatekeepers who are afraid to discuss, much less confront, the realities of genetic forces underlying racial differences in behavior are keeping this knowledge from the general public. No one wants to reignite the racism that gave us Social Darwinism, eugenics, and the Holocaust, he argues, but now that racism has been officially repudiated it is time to move on to a scientific examination of how genetic natural selection made the behavior of the major human races different, producing today's spectacle of global inequality. On his book tour, Wade refused any association with notions of racial superiority:

> There is absolutely no claim of superiority. It's absurd to say that one is superior than the other. But there are characteristics of Western society which we should understand and value, and those are the ones that have made Western society as successful as it has been. (CBC Radio 2014)

The book is not about racial superiority, then, unless you consider being more successful economically, politically, and culturally—because of your genes—an indicator of superiority.

As an essential building block to his story, Wade needs readers to understand that, contrary to what they have been told about how evolution ended for humans before the dawn of recorded history, the truth is that "human evolution is recent, copious and regional" (Wade 2014a, 7, 251)—a phrase with which he opens and closes the book. Unlike previous scientific claims about racial inequality, Wade wants readers to understand that modern science is now able to prove this in a way that we never could have understood when, for example, Stephen Jay Gould (1985) described race differences as "skin deep." Wade plants his flag with the first cited fact in the book: "No less than 14 percent of the human genome, according to one estimate, has changed under … recent evolutionary pressure" (p. 2).

Wade is wrong on this number, but the specific value has no clear implication for his theory—it is one of those cases where any number greater than 0 percent would mean the same thing for his argument (still, it served as the substantively impressive, scientific-sounding claim cited in reviews by supportive critics such as Robert VerBruggen [2014] and Murray [2014].) Many studies of the human genome have scanned for traces of selection pressure in the patterns of genetic variation, that is, roughly, variation between regional populations that is

patterned rather than random. Wade writes, "If one takes just the regions marked by any two of the scans, then 722 regions, containing some 2,465 genes, have been under pressure of natural selection." That, he says, "amounts to 14 percent of the genome" (2014a, 108). Later he extends this to support the claim of racial differentiation, as "many other traits are now known to have developed independently in each race, transforming some 14 percent of the human genome" (2015a, 242).

Wade's source is a review by Joshua Akey (2009), but Wade read it wrong, getting tangled up in repetitions of the number fourteen. It is not 14 percent of the genome that is under selection in two studies. Rather, 14 percent of genome regions had been identified as under selection pressure in at least *one* study, and, coincidentally, 14 percent of the regions identified once also were identified a *second* time. The number Wade wants—the portion of the genome found in at least two studies to have been under pressure of natural selection—is actually 8 percent (not all regions include the same portion of the total genome). Ironically, Wade's error is very similar to how some genetic mutations often take place, by miscopying repetitions.

Wade (2014a) makes the point about recent human evolution because it underscores the idea that genes determine social behavior and, specifically, differences in behavior between groups. Despite occasional caveats about the relative importance of culture, he repeatedly returns to the idea of "genes governing social behavior" (p. 46) and "social behavior … under genetic control" (p. 47). There is no actual evidence for genetic variation explaining behavioral differences across groups. But his logic is to associate two facts—the continuing effect of natural selection and the wide differences in social behavior between races. If evolution continues—along racial lines—and racial groups differ in behavior, he argues, anyone but a naïve social constructionist would admit the connection.

To establish that genes control social behavior—the kind that determines the fate of societies—Wade (2014a) turns to the ancient history of humans and the first settlement into agricultural communities. "Most likely a shift in social behavior was required," he writes, "a genetic change that reduced the level of aggressivity common in hunter-gatherer groups" (p. 82). In this description he neglects many elements involved in the transition to settled society, including climate change and geography, population pressure, the presence of various plants and animals, advances in tools and weapons, and human biological evolution. To highlight the hypothesized genetic change, Wade argues that evolutionary de-aggression may be deduced from changes in human bone structure, the thinning of bones over time. People became more social in the era leading up to settlements, he argues, and they fought less. Thus, in the millennia leading up to settled societies, "the most bellicose members of the society were perhaps killed or ostracized" (p. 82), which would have conferred a reproductive advantage on less aggressive people, leading to thinner bones.

This story has some adherents. Cieri and colleagues (2014) suggest that the "feminization" over time in human facial structure is consistent with declines in adult testosterone levels among males in the millennia leading up to human settlements, which might fit the declining aggression hypothesis. However, this

causal story—in which there was a declining advantage of aggressive behavior, leading to selective changes that favored less aggressive people, and therefore society—is nothing like settled science. Steele and Weaver (comment in Cieri et al. 2014) summarize their concerns with the theory this way: "Although we find this model intriguing, to be widely accepted it will need to overcome some challenges: ambiguous evidence, data deficiencies, and contradictory evidence" (see also comments in Cieri et al. [2014] by Athreya, Holliday, and Wrangham).

In fact, explanations for humans' thinning bones remain speculative. Some research focuses on lifestyle changes—the growing use of tools and the declining "habitual loads" on human limbs (Trinkhaus 1997). It is even possible that human bones became thinner without a genetic change. Biological anthropologist Christopher Ruff (2006, 514) writes, "In a few years, the strength of a person's bone structure can change as much as the total average change over the past 2 million years of human evolution." We have a lot of evidence that, for modern humans, exercise increases bone size; for example, studies comparing the left and right arms of competitive tennis players (Bass et al. 2002; Haapasalo et al. 2000). Furthermore, diets of softer foods lead to thinner skull bones (Menegaz et al. 2010). On the other hand, some researchers favor an explanation of genetic adaptation to climate change driving early human bone evolution, a position that is subject to considerable debate (Pearson 2000). To settle this, it would be helpful to compare the bones of ancient and contemporary infants, but no such studies seem to have been done.

I focus on this apparently arcane argument over bone evolution because Wade uses it to support the core assumption that social behavior is selected genetically, which in turn justifies his racial theory. Wade writes, "The individuals whose social behavior is better attuned to social institutions will prosper and leave more children, and genetic variations that underlie such a behavior will become more common" (2014a, 64). Despite the confident tone, this is only speculation. An alternative hypothesis, reasonable given the existing evidence, is that what evolved in humans was brain capacity rather than genetic dictates for specific social behavior, and that that capacity enabled invention and communication, which facilitated teaching and learning (especially language) and drove societal development.

Can we explain dramatic social change without behavioral genetic evolution? Of course; we do it all the time. We know that successful people and their children can prosper and propagate their behavioral gospel—by example or through coercion and force—without any genetic change, because it so often happens in a time span too short for natural selection to play a role. Consider, for example, the recent population growth of religious sects such as Mormons (Skolnick et al. 1978) and Orthodox Jews (DellaPergola, Rebhun, and Tolts 2000)—versus Protestants and more secular Jews—in the United States. Following sudden (in historical terms) religious edicts, these sects developed high fertility rates and transmitted those as norms to their children, so their populations grew relative to the majority in successive generations. The mechanisms for this kind of change are well established by modern social science, having nothing (that we know of) to do with genetic fitness.

Race and Evolution

That race is a "social construction" does not imply that it does not exist. We need to dispel that confusion for two reasons. First, at the risk of stating the obvious, things that are socially constructed are still constructed—they exist socially. The vast, historically persistent, life-and-death consequences of race in human societies cannot be ignored or dismissed as figments of our collective imagination. Race was not the cause of Africans being stolen from their homes and sold into slavery in the Americas; it was a result of that process. Race is the idea that people identified by different presumed ancestry and physical characteristics are inherently different—and hierarchically ranked—and race produces racial inequality, which is reproduced socially.[3] As an example of the social construction of race, Ossorio and Duster (2005) point out that, although Africans have the greatest genetic diversity of any continental population—that is, they are the least biologically coherent of the common races—in many parts of the world Blacks are at the low end of the social hierarchy, which produces common patterns of health and social behavior, which in turn reinforces the common perception that they are biologically similar.

Second, asserting that race does not exist ignores the real genetics of human variation according to ancestral origins and the human migrations that located people around the world. Most of the variation that emerged over thousands of years of (imperfect) separation was random coding errors that stuck for no good reason. However, some was the result of moving between climate zones (such as skin color), some allowed people to survive better with different diets (such as lactose tolerance), and some was the coincidental by-product of a helpful disease adaptation (sickle cell disease for those who developed one kind of resistance to malaria).[4] This does not validate the common conception of race: that there are races that can be definitively demarcated biologically, that there are a fixed number of races, that today's commonly identified racial identities are historically persistent, that racial divisions are inevitable in society. But races are real because they are socially constructed (both in the separation versus comingling of different populations and in the political economy of racial division), and human genetics do vary according to geographic origin and other dimensions. Social scientists can oppose racial constructions without obstructing the pursuit of knowledge about human genetic variation.

The relationship between identity categories and genetic clustering is the subject of recent article by Guang Guo and colleagues (2014), which discusses the social construction of race. They compared DNA samples from people in the United States to those from three populations: Whites from Utah (indicating European ancestry); people from Beijing and Tokyo (indicating East Asian ancestry); and people from Ibadan, Nigeria (indicating African ancestry). The people in their U.S. sample mostly had genetic markers that identified their self-reported racial classification; that is, people who said they were White had markers most similar to those of the Whites from Utah. But when survey respondents were forced to identify with only one race, those of mixed African and European

ancestry usually self-identified as Black, following the "one-drop" rule. And the one-drop rule is not just a matter of identification: the biological relationship of Africans and Europeans in America is written in the DNA, too. There were many more people with African ancestry in the 50 percent to 90 percent range than there were in the 10 percent to 50 percent range. That follows from social enforcement of the one-drop rule: Americans with mixed African and European ancestry are considered Black, and therefore have been much more likely to marry Blacks than to marry Whites. So the mixing between the populations is skewed, and there are a lot more majority-Black families with some White ancestry than there are majority-White families with some Black ancestry. (Henry Louis Gates, Jr. [2013] has explored this through his PBS series on African American genealogy.)

Both racial identification and ancestry are the product of interacting social and biological elements. The population of African Americans—the descendants of African slaves and Americans of European origin—is not an extrahistorical mix of two "real" races. It is a recently formed group with ancestors from several places. In other words, the African American population is like all the other ancestry groups in the world created over the millennia, some of whom mixed freely, some under duress, some as migrants, some as conquerors. This creating of new blends of humanity, as much as the definition and labeling of categories, is also the social construction of race. Nothing in this research suggests that racial identities are themselves genetically based. The social identities associated with ancestral history coincide with the genetic clusters that flowed from geographic separation, but it does not follow that these identities are genetic in their origin or maintenance.

Note that Guo et al. (2014) started with preidentified (relatively homogeneous) benchmark samples, and then used survey data in which people self-identified from the same list of groups. Finding that a group of people who calls themselves African American is more similar on a select group of distinguishing genetic markers to a sample of Africans than they are to a sample of Europeans on those same markers does not address one way or the other the validity of the categories compared with another scheme that could be constructed using different samples or markers. It does tell us that if you had saliva instead of a picture of someone, you are likely to be able to identify certain aspects of her or his ancestral origin with respect to geographic regions, but the substantive significance of such clustering is an empirical question these studies cannot answer. As Fujimura et al. (2014, 220) explain,

> The ability to construct clusters is not significant in the context of the traits and behaviors of interest to sociologists. There is no evidence that the studied markers or observed clusters have any bearing on these traits or behaviors.

There are, as Wade (2014a) says, genetic "clusters of variation" (p. 96) that link people with similar geographic regions of ancestry. But such a prosaic description is not why Wade drove to this point. "It is reasonable to assume," he writes,

> that if traits like skin color have evolved in a population, the same may be true of its social behavior, and hence the very different kinds of society seen in the various races and in the world's great civilizations differ not just because of their received culture—in other words, in what is learned from birth—but also because of variations in the social behavior of their members, carried down in their genes. (p. 41)

To make his story about natural selection "choosing" different behavioral traits match the historical case, Wade must establish that the genetic clusters really do correspond to races as commonly understood. Wade occasionally acknowledges that the dividing lines between races are arbitrary and the number of categories is a matter of judgment (p. 92). However, the disparities that he is trying to explain—the differences between the civilizations of Caucasians (the standard to which others are held), East Asians (very smart but lacking creativity), and Africans (locked in tribalism)—require a clear racial demarcation. He thus insists on discussing those three "major" races, while acknowledging five "continental" races, adding Pacific Islanders and Native Americans, which he rarely mentions: "To keep things simple, the five-race, continent-based scheme seems the most practical for most purposes" (p. 100).

Wade relies on a 2008 study that examined the DNA of 938 people from fifty-one populations around the world, identifying seven statistical clusters of genetic variation (Li et al. 2008). The choice of seven in this study was justified by the observed clustering. However, only six of the fifty-one populations were from sub-Saharan Africa (a weakness the authors, but not Wade, acknowledge). This is the beginning of Wade's mistreatment of Africa.

Why is all of sub-Saharan Africa considered one racial group? The answer is social, not biological (Fujimura et al. 2014; Morning 2014). Africa, as the source of modern humans, has the greatest genetic variation of any region. To see the breadth of that diversity, however, you have to look for it. A global analysis by Sarah Tishkoff and colleagues (2009) used a similar DNA clustering method but included samples from 121 different populations in Africa as well as 60 from around the world (including African Americans). On their global scale there were fourteen clusters of genetic variation, nine of which were African. That is, nine different groups within Africa were delineated with specificity comparable to that seen separating Europe, Asia, and the Americas. The vast diversity within Africa should have warned Wade away from lumping Africans into one racial category, but he ignores this fact.

With Africa safely reduced to a single racial category, Wade begins to explain why genetics caused its problems. As in the story of the first agricultural settlements, Wade says people need to evolve certain behaviors to advance: they need to "develop the ingrained behaviors of trust, nonviolence and thrift that a productive economy requires" (2014a, 189). In short, they need "the transformation of a population's traits from the violent, short-term, impulsive behavior typical of many hunter-gatherer and tribal societies into the more disciplined, future-oriented behavior seen in East Asian societies" and England (2014a, p. 178).

The failure of Africa to evolve the necessary traits for success in our modern world is not for lack of resources, since "the West has spent some $2.3 trillion in

aid over 50 years without managing to improve African living standards" (Wade 2014a, 183). Despite such largess, Wade (2014a) contends, Africa remains mired in poverty because it remains stuck in tribalism—genetically. "European powers prepared their colonies for independence by imposing their own political institutions" (p. 147), he writes (in what would presumably be news to those who fought in the many African wars for independence). Despite this preparation, they did not become "detribalized overnight," but rather "reverted to the kind of social system to which Africans had become [genetically] adapted during the previous centuries" (p. 147).[5] Colonialism (and slavery, which he does not mention) naturally slowed Africa's development. However,

> though it was justifiable at first to blame the evils of colonialism, two generations or more have now passed since most foreign powers withdrew from Africa and the Middle East, and the strength of this explanation has to some extent faded. Tribal behavior is more deeply ingrained than mere cultural prescriptions. Its longevity and stability point strongly to a genetic basis. (p. 177)

Wade offers no genetic evidence to support his story of Africa's poverty, because none exists. In the absence of evidence, Wade resorts to homicide statistics. Most countries in sub-Saharan Africa have higher homicide rates than wealthy countries, which he calls "a difference that does not prove but surely allows room for a genetic contribution to greater violence in the less developed world" (p. 172). As Biologist H. Allen Orr (2014) points out in a devastating review, the existence of a difference is not evidence for one cause of that difference.

One line of behavioral genetic research dates back to the days before today's genome-wide association (GWA) studies, in which researchers looked for effects of individual "candidate" genes (D'Onofrio and Lahey 2010). This approach was valuable, especially when the role of specific genes was known (as in the case of the BRCA1 gene, associated with a higher risk of breast cancer). However, with most diseases, and especially with behavior, which are presumed to be more complicated than single-gene mechanisms, candidate gene studies are often fishing expeditions, with a high risk of false-positive results, amplified by selective publication of positive findings.

One behavioral trait subject to candidate gene research is aggression. Wade devotes considerable attention to MAO-A, the gene that encodes the enzyme monoamine oxidase A. He singles out two studies showing that a rare version of the gene was associated with violence in U.S. male adolescents. Out of 1,200 young men surveyed in the Add Health study, 11 (0.9 percent) particularly violent young men carried the 2R version of MAO-A, known as the "warrior gene." In the first study, that 0.9 percent of the sample committed about 2.1 percent of the violent acts, way out of proportion to their tiny number (Guo et al. 2008). The second study, using the same sample, reported that 9 of those 11 were African American, composing 5 percent of the Black male adolescents in the study (Beaver et al. 2013).

Now Wade is off and running. He has a gene variant that is more common (though still rare) among Black men and that is associated with elevated rates of violence. Wade (2014a) summarizes, "The wider point illustrated by the case of the MAO-A gene is that important aspects of human social behavior are shaped by the genes and that these behavior traits are likely to vary from one race to another, sometimes significantly so" (p. 57). Later he calls it, "one behavioral gene that … is known to vary between races and ethnic groups, and many more will doubtless come to light" (p. 110). And then he takes it even further, declaring that "the differences in this gene may have been shaped by natural selection" (p. 127).

It is possible that this is true. But it certainly overstates the strength of the existing case. Consider that in the Add Health data, Black male adolescents were more than twice as likely as Whites to report committing an act of violence (Harris et al. 2006). Any gene that happened to be correlated with violence would likely also be correlated with race. The MAOA-2R story is not completely random, because there was reason to believe MAO-A was associated with aggression already, but there was no particular reason to believe the rare 2R variant was most strongly implicated before these two studies were done. Confirmation with GWA methods may strengthen this case in the future—or not—but Wade's inflated interpretation is not justified by this evidence.

Beyond those nine violent African American adolescents, racial variation in the United States is strangely absent from Wade's book. Why not look at people who move between societies? Beyond a nod to the success of Asian and Jewish immigrants, he says nothing of the upward mobility of those from poor countries, such as Latinos, who after only a generation or two have had birth rates in line with the non-Hispanic U.S. population (Parrado 2011). And what about African Americans, whose tribal genes should (by his theory) make them fish out of water in a Caucasian-designed society. How can it be that the descendants of African slaves can now be so much richer (or, as Wade would say, "more productive") than their cousins in Africa today? Even more successful are the immigrants from Africa or the West Indies (Byrd et al. 2014; Model 2008), whose academic and economic success seems at odds with Wade's thesis (despite, at least in the African case, less genetic mixing with European populations). Of course, we have no more reason to believe the success of these groups is due to their genetic makeup than we have to assume genetic origins lie behind the relative subordination of Black Americans. The point is that racial biology does not seem to hold these populations down in the way Wade imagines it would—the same way he claims biology hinders the development of poor countries (see below). Without discounting the inequality and discrimination many immigrants experience, a wide swath of research shows that "immigrants are largely assimilating into American society" in terms of socioeconomic status, residential distribution, language acquisition, and intermarriage (Waters and Jiménez 2005). This seems like a natural test of the battle between genetic and cultural determination of social behavior.

To address global inequality, Wade asks, "What is it that prevents poor countries from taking out a loan, copying every Scandinavian institution, and becoming as rich and peaceful as Denmark" (2014a, 13)? He explains:

> Because these [social] behaviors vary slightly from one society to the next as the result of evolutionary pressures, so too may the institutions that depend on them. This would explain why it is so hard to transfer institutions from one society to another. American institutions cannot be successfully implanted in Iraq, for instance, because Iraqis have different social behaviors, including a base in tribalism and a well-founded distrust of central government. (2014a, 14)

The crisis generated by poor-country debt in the 1980s and the disastrous consequences of the U.S. war in Iraq are each the subject of vast research literatures in many disciplines. In scientific research, one would present one alternative explanation generated by this research, and hold it up to the light of behavioral genetic theory. Instead, Wade is so pleased with his pronouncement on American institutions in Iraq that he repeats it two more times (2014a, 127, 148).

But the failure of Iraqis or Africans to adapt to modern capitalism does not explain the success of today's wealthy societies. "The rise of the West was not some cultural accident," Wade declares. "It was the direct result of the evolution of European populations as they adapted to the geographic and military conditions of their particular ecological habitat" (2014a, 238). Wade uses England's path to the industrial revolution to explain that process, relying on the story from economist Gregory Clark's *Farewell to Alms* (2009). Clark reports that interest rates fell in England from 1400 to 1850. This trend is supposed to show that—unlike children, hunter-gatherers, or modern Africans—the English were developing a willingness to delay gratification. The falling interest rates "indicate that people were becoming less impulsive, more patient and more willing to save … [which] gradually transformed a violent and undisciplined peasant population into an efficient and productive workforce" (Wade 2014a, 158). Also, violence fell and literacy rates rose.

How could the English gene pool have improved so much in only a few centuries? Wade's answer is the "ratchet." Clark showed that rich people listed more heirs in their wills than did poor people. Yet because the size of the upper class did not increase, a sizable fraction of the rich had to breed with those below their birth status. In this way, "the values of the upper middle class—nonviolence, literacy, thrift and patience—were thus infused into lower economic classes and throughout society" (Wade 2014a, 160).

For this theory to hold, the following would have had to be true: (1) England in 1400 was already a meritocracy, in which the rich held the values of nonviolence, literacy, thrift, and patience more than the middle class and the poor; (2) those values were genetically encoded and passed on to their children; (3) there was time for good genes to spread downward across the class structure in a few centuries; and (4) subsequent industrialization was the result of nonviolence, literacy, thrift, and patience in the population. The easiest of these to

disprove is the issue of time. Even if the mechanism were correct, this evolutionary progression could not plausibly have happened in a few centuries.

Wade justifies the claim by retelling the story of Russian geneticist Dmitry Belyaev's breeding of foxes for tameness, which produced tame foxes in thirty-five generations (Goldman 2010). But Belyaev used extremely strong selection criteria; he made his tame strain by selecting only the tamest 20 percent of each generation. England had much smaller fertility differences and selection pressures (see Johnson 2014). Wade points out that people with estates over £1,000 had just over four children, while those with less than £10 had just under two children. That is a big social class difference for humans (much bigger than in the United States [Cohen 2013b]). But what Wade does not tell you—but reported in a separate paper (Clark and Hamilton 2006)—is that less than 5 percent of the population left wills of £1,000 or more. In fact, 71 percent had wills below £50. An analysis by Boberg-Fazlic, Sharp, and Weisdorf (2011) of fertility data from preindustrial England shows the math for Clark and Hamilton's mechanism is not there. Children of the rich "were small in number relative to poorer sections of society" (p. 365). Furthermore, there was also upward mobility from the much larger lower classes. That means that in the fight for the middle-class gene pool, there were more poor people than rich people spreading their seeds, and not enough opportunity for the children of the rich to spread their supposed good genes.

Evolutionary Mechanisms

The story of England above illustrates an important problem: the demography of modern societies is a poor launching pad for genetic revolutions, and it is getting worse (which means better). The decline in child mortality and the extension of life expectancy beyond the childbearing years means that relatively few people die before having children. By my calculations from U.S. census data and mortality statistics (U.S. Department of Commerce 1921), in 1900 only 53 percent of females born lived to be age 40 and had a surviving child. That could generate some selection pressure (very slowly), if the people who reproduced were different genetically from those who did not. In the United States today, however, 97.8 percent of females born live to age 40 (Arias 2014), and 85 percent of those have a birth (Martinez, Daniels, and Chandra 2012), so 83 percent of females born become biological mothers. And a good part of modern childlessness is voluntary, rather than the consequence of a genetic weakness. The principles of natural selection still apply to modern humans; but they probably do not work very well these days.

Natural selection is likely not how societies change in the modern era. But this is Wade's default explanation. Consider his description of Australia, which he uses to argue against Jared Diamond's *Guns, Germs and Steel* (1999), an account of world history that dismisses genetic evolution as an explanation. How is it, Wade wonders, that Paleolithic Age native Australians were unable to build a

modern economy, but Europeans could succeed so quickly on the continent? "If in the same environment … one population can operate a highly productive economy and another cannot, surely it cannot be the environment that is decisive … but rather some critical difference in the nature of the two people and their societies" (2014a, 222). Apparently, by "the nature of the two people and their societies," Wade does not mean the boats, weapons, technology, and modern state social organization that the Europeans possessed, because then he has made Diamond's point. So the "nature" he refers to must be genetics. To the reader who has a passing familiarity with modern social science, this perspective is jarring.

It does not help that Wade possesses a very mechanical view of genetic influence on behavior. He concedes that the science to support his view is "still largely opaque" (2014a, 237), and then proceeds as if this were a mere detail, a mopping-up operation waiting to happen. This is the same attitude that Charles Murray takes about genetic science—that it is only a matter of time before research confirms what he thinks. In his book *Coming Apart* (2012, 299), Murray writes:

> I am predicting that over the next few decades advances in evolutionary psychology are going to be conjoined with advances in genetic understanding, leading to a scientific consensus that goes something like this: There are genetic reasons, rooted in the mechanisms of human evolution, why little boys who grow up in neighborhoods without married fathers tend to reach adolescence not socialized to the norms of behavior that they will need to stay out of prison and hold jobs.

In his review of Wade, Murray (2014) picks up on this theme:

> Soon there will be dozens, then hundreds, of such links [between specific genes and specific traits] being reported each year. The findings will be tentative and often disputed—a case in point is the so-called warrior gene that encodes monoamine oxidase A and may encourage aggression. But so far it has been the norm, not the exception, that variations in these genes show large differences across races. We don't yet know what the genetically significant racial differences will turn out to be, but we have to expect that they will be many. It is unhelpful for social scientists and the media to continue to proclaim that "race is a social construct" in the face of this looming rendezvous with reality.

Where that research is leading of course cannot be known until it gets there, but there is little in the evidentiary record to support Murray's vision (he mentions nothing besides MAO-A). Wade's interpretation was rejected by more than one hundred population geneticists and evolutionary biologists (including Joshua Akey and Sarah Tishkoff), who wrote,

> Wade juxtaposes an incomplete and inaccurate account of our research on human genetic differences with speculation that recent natural selection has led to worldwide differences in I.Q. test results, political institutions and economic development. We reject Wade's implication that our findings substantiate his guesswork. They do not. We are in full agreement that there is no support from the field of population genetics for Wade's conjectures. (Coop et al. 2014)

Of course the behavioral tendency toward such traits as cooperation and trust are the building blocks of social institutions. But it does not follow that "probably all these social behaviors, to one degree or another, have a genetic basis" (Wade 2014a, 124). It is equally plausible that they emerge from much more generic capacities of human intelligence and adaptation, and become reinforced through cultural evolution and learning. Intelligence may have promoted complexity in social interactions. For example, the ability to comprehend what others are thinking—and what they think of us—could lead to cooperative behavior as an instrumental adaptation even if no specific genetic driver for cooperative behavior itself exists.

Wade is awed by the power of breakthroughs in genetics, but he seems uninterested in the blossoming research on brain development. This is one way that culture adapts and reproduces: children's brains adapt to their environment and experiences. For example, children in the United States today are exposed to a pink-is-for-girls culture. Even though this is a very recent phenomenon (Paoletti 2012), the ubiquity of girls in pink appears so universal as to seem genetic (and this has been naïvely hypothesized). By the time today's children are grown, they do not remember a time when they did not know pink was for girls. There is also evidence that even adults' color preferences are shaped by their environments, including the gender of their children (Cohen 2013a).

The downside of children's intense learning capacity at early ages is that insults to their health and psychological well-being insinuate themselves deep into their cognitive apparatuses. For example, the toxic effects of poverty on children's developing brains may cause "differences in long-term memory, learning, control of neuroendocrine functions, and modulation of emotional behavior" (Hanson et al. 2011, e18712). Such an effect could in principle be repeated over generations within poor populations without producing inherited genetic traits, which could explain long-term disparities between populations without genetic adaptation by natural selection.

In fact, the evolution and replication of social structures through interactions have been the subjects of extensive social science modeling. Agent-based models show that very different social structures can emerge from various initial conditions (Macy and Willer 2002). For example, the evolution of trust and cooperation may be generated by social interaction and learning, as people learn the benefits of cooperation and complementary norms spread through the population and across generations (Macy and Skvoretz 1998). This research implies that genetic adaptation to different social structures is not necessary for the evolution of different types of societies, starting from people with the same "hard-wired" behavioral instincts.

The case of international adoption provides an obvious example (to me, an adoptive parent). Adopted children adapt to their adoptive cultures in much the same ways native-born children do (despite the thorny issues related to how race affects their social interactions), consistent with expectations that complex cultural traits are highly transferable regardless of genetic ancestry. At the same time, however, this population illustrates the durability of early influences as well: children adopted from China before age two, growing up speaking French only,

still process some language cues in the same way that Chinese-speakers do, rather than employing the brain regions used by native French speakers (Pierce et al. 2014). (The effect was stronger the later the children were adopted, suggesting this was not a genetic effect but the result of exposure to Chinese language during infancy.) Thus, divergent social structures, and highly unequal outcomes, for human populations living in different environments are quite consistent with the understanding that human evolution has not changed people much since modern humans dispersed from Africa.

Genetic Taboos

What influence should the genetics of race have on social science? Murray's (2014) interpretation is unambiguous:

> The genetic findings that Mr. Wade reports should, in a reasonable world, affect the way social scientists approach the most important topics about human societies. Social scientists can still treat culture and institutions as important independent causal forces, but they also need to start considering the ways in which variations among population groups are causal forces shaping those cultures and institutions.

Hardly anyone admits to being a bona fide racist (but the few people who do, incidentally, love this book, as a perusal of the White supremacist community Stormfront.org reveals). But Wade argues that the history of Social Darwinism, eugenics, and the Holocaust have infected the modern liberal mind so much that we not only do not want to think about the behavioral genetics of race, but we do not want anyone else to either. In a defense of the book, Wade (2014b) writes, "It takes only a few vigilantes to cow the whole campus. Academic researchers won't touch the subject of human race for fear that their careers will be ruined."

I am not aware of evidence that genetic scientists are cowed by fear of violating racial taboos and redirect their careers accordingly, but that may be the case. Of course, the size of the literature on human genetic diversity—funded by the government, conducted at major universities, published in the most prestigious journals, reported in the leading newspapers—weakens Wade's case.

The idea of using Darwinism to "justify dominion over others and deny welfare to the poor," Wade writes, "has been so thoroughly repudiated that it is hard to conceive of any circumstance in which it could be successfully resurrected" (2014a, 249). But explicit, official racism is not (at the moment) the principal threat, so this is a red herring. Even if Social Darwinism is not the law of the land, racial discrimination persists, with tragic consequences (Reskin 2012). We see this in audit studies revealing discrimination in housing (Ondrich, Stricker, and Yinger 1999), employment (Pager and Western 2012), and even shopping online (Doleac and Stein 2010); we see it in policing practices (Kochel, Wilson, and Mastrofski 2011) and incarceration policies (Kutateladze et al. 2014); and we see it in policy debates over economic development in poor countries. *A Troublesome Inheritance* adds fuel to contemporary racism, with the trappings of genomic science.

It may be the case, as Freese (2008, S1) claims, that "the vast majority of individual-level outcomes of abiding sociological interest are genetically influenced to a substantial degree." And it may be true that the historical migration and dispersion of people around the planet have resulted in genetically identifiable clusters that sometimes follow the contours of commonly understood races. But it does not follow that genetics explains the relative status and well-being of today's racially identified groups or their societies. In fact, these two lines of inquiry—the genetics of behavior and the geographic variation in human genetics—do not depend on each other; the strong case linking them is the contemporary expression of scientific racism. The publication of Wade's *Troublesome Inheritance* serves as a potent warning of the continued resonance of racially deterministic narratives of social inequality.

Notes

1. Portions of this article were published in my review of Wade (2014a) for the *Boston Review* (Cohen 2014).

2. Here, "a few decades" appears to modestly refer to the time since the publication of Murray's *The Bell Curve* (Herrnstein and Murray 1994).

3. Game-theory simulations show that after a population is seeded with a small number of racists, the inequality they produce perpetuates itself indefinitely through learning and memory even in the absence of ongoing racial animus (Stewart 2010).

4. Much of the medically important variation occurs between small, local groups, not those usually thought of as races, such as Ashkenazi Jews (Ossorio and Duster 2005).

5. We know that when he says Africans "adapted" to tribalism, he means genetically adapted, as he made clear earlier in the book: "the words adapt and adaptation are always used here in the biological sense of a genetically based evolutionary response to circumstances" (Wade 2014a, 58).

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