Transcript

RACE - THE POWER OF AN ILLUSION

Episode One: The Difference Between Us

(01:00:56)

NARRATOR: There is no question that individual human beings are different, one from the other. Our eyes confirm this day in and day out. Skin color. Body shape. Hair form. Eye shape. For several hundred years we have used these visual differences to classify people into four or five groups we call races.

PILAR OSSORIO, Legal Scholar / Microbiologist: We have a notion of race as being divisions among people that are deep, that are essential that are somehow biological or even genetic, and that are unchanging - that these are clear cut distinct categories of people.

RICHARD LEWONTIN, Evolutionary Geneticist: And the beauty of the race business is that you can identify people by just looking at them. You don't even have to look at their genes because one manifestation of their genes is there - namely skin color or eye shape or hair shape - and then that's the key to everything.

NARRATOR: The idea of race assumes that simple external differences, rooted in biology, are linked to other, more complex internal differences. Like athletic ability. Musical aptitude. Intelligence. This belief is based on the idea that race is biologically real.

OSSORIO: All of our genetics now is telling us that that's not the case. We can't find any genetic markers that are in everybody of a particular race and in nobody of some other race. We can't find any genetic markers that define race.

SCOTT BRONSON, DNA Workshop Leader: And actually, what we're going to generate are billions of copies of a little section of your, of your genetic code.

NARRATOR: These students are gathering for a DNA workshop led by Cold Spring Harbor Labs teacher, Scott Bronson. Marcus, Gorgeous, Jackie, Noah, Hannah, Jamil and their fellow students are about to explore the biology of human variation.

BRONSON: But there's another type of DNA. Does anyone know what that type of DNA is?

STUDENT (off camera): Mitochondrial?

BRONSON: Mitochondrial DNA...very good.

NARRATOR: They will compare their skin colors. They will type their blood. And they will swab cells from inside their mouths to extract a small portion of their own DNA. Once the sample is ready, they will compare some of their genetic similarities and differences. The students begin the workshop with the same assumptions most of us have.

BRONSON: As you begin to look at the data, you might want to keep in your mind, who you think you might be most similar to and who you think you might be most different to.

NOAH: I think I probably have the most similarities with, uh, Mr. Bronson or with Kiril because we are white males, both Kiril and I and both Scott Bronson and I.

JAMIL: I think I have the most differences with Kiril and the most similarities with Gorgeous. She's African American, I'm African American. I mean, like Black.

HANNAH: I think maybe me and Natalia are most alike. She's Latin American, and I'm Latin American. I figured that there would be tons of differences especially with people who looked so different.

(01:04:38)

ALAN GOODMAN, Biological Anthropologist: To understand why the idea of race is a biological myth requires a major paradigm shift, an absolute paradigm shift, a shift in perspective. And for me, it's like seeing, you know, what it must have been like to understand that the world isn't flat. And perhaps I can invite you to a mountain top and you can look out the window and at the horizon and see, "oh what I thought was flat I can see a curve in now," that the world is much more complicated. In fact, that race is not based on biology but race is rather an idea that we ascribe to biology.

NARRATOR: The idea of race as biology is ferociously persistent on America's playing fields. Gorgeous Harper and her teammates are competing at the Adidas Nationals.

GORGEOUS: I love to run track - I've been running track since I was eight years old. The people I train with, they all want to be the best - and you gotta put in the hard work.

NARRATOR: This is the top event for elite high school track and field stars. And while racial differences are not necessarily discussed openly, they are often part of the careful calculation of competitive edge.

FEMALE RUNNER: Well, I've heard, some rumors I've heard are just like Blacks have an extra muscle in their leg. But I don't think

anything's true.

SECOND FEMALE RUNNER: I assume that a white girl can't beat me in the 200. In my mind I don't think she can beat me, but I won't, I won't sleep on her.

MALE RUNNER: I don't want to get too controversial here, since I really don't know exactly. But I'd say that there's maybe a little bit that - not to use as an excuse as why they beat me sometimes - but maybe, considering when you, when you look at the Olympics, you know, who, who tends to dominate the 100, the 200 and the quarter, for the most part. I'd just have to say the way it all falls out tends to point to what your race is.

JON ENTINE (in news clip) I'm really saying that different populations, whether it's West African descended Blacks, and that's what African Americans trace their ancestry to West Africa, or East Africans, or whites or Asians, they all have different body types and different physiological structures that allow them to have advantages in one sport or another. There's a genetic basis for these kinds of differences. Through, uh, culture, environment, training, athletes can't dramatically change the limits of what they can be.

JIM BROWN (in news clip): I would like to say to Jon there is no scientific definition that holds up about race. Race has changed its definition in this country to the benefit of those who wanted to define it differently. And there is no scientific place to start from, so you have no basis for your work.

NARRATOR: We can see differences among populations, but can populations be bundled into what we call races? How many races would there be? Five? Fifty-five? Who decides? And how different would they really be from one another?

(01:08:20)

JOSEPH GRAVES, Evolutionary Biologist: The measured amount of genetic variation in the human population is extremely small. And that is something that, that people need to wrap themselves around. That genetically, we really aren't very different.

NARRATOR: In fact, genetically, we are among the most similar of all species. Only one out of every thousand nucleotides that make up our genetic code is different, one individual from another. These look-alike penguins have twice the amount of genetic difference, one from the other, than humans. And these fruit flies? Ten times more difference. Any two fruit flies may be as different genetically from each other, as a human is from a chimpanzee. So the central question for us is: of the small amount of variation between us, what if any, is mapped along what we think of as racial lines?

Because we live in a racialized society, this is not an academic question. We have a long history of searching for racial differences and attributing performance and behavior to them. For two hundred years, scientists poked and prodded, measured and mapped the human body searching for a biological basis to race. Some measured facial angle to illustrate the proximity of races to the primitive. Others calibrated skull size to identify those with superior or inferior intelligence. Measures of eye shape, hair form, even brain color were scrutinized in the hunt for the fundamental sources of racial difference.

EVELYNN HAMMONDS, Historian of Science: If we just take African Americans as an example, there's not a single body part that hasn't been subjected to this kind of analysis. You'll find articles in the medical literature about the Negro ear, and the Negro nose, and the Negro leg, and the Negro heart, and the Negro eye, and the Negro foot - and it's every single body part.

And they're constantly looking for some organ that might be so fundamentally different in size and character that you can say this is something specific to the Negro versus whites and other groups.

Scientists are part of their social context. Their ideas about what race is are not simply scientific ones, are not simply driven by the data that they are working with. That it's also informed by the societies in which they live.

(01:12:00)

NARRATOR: At the turn of the 20th century, American society was riding a wave of confidence as an emerging industrial power. And the face of its power and prosperity was white.

African Americans lived under the yoke of Jim Crow segregation. Most surviving Native Americans had been banished to reservations. And new immigrants crowded into urban ghettos. Disease was rampant. Death rates soared. Infant mortality was high. To many, this reflected a preordained natural order.

HAMMONDS: Those that looked, wanted to confirm what they saw, which is to say that the proper place of, say the Negro, or in other regions of the country, the Native American, or the Chinese, were at the bottom of the, the social and political hierarchy. And if you can say that they are fundamentally biologically different, than they should be, then it's natural for them to be at the bottom of our social hierarchy.

GOODMAN: The biology becomes an excuse for social differences. The social differences become naturalized in biology. It's not that our institutions cause differences in infant mortality, it's that there really are biological differences between the races.

NARRATOR: For Prudential Life Insurance statistician, Frederick Hoffman, those differences could lead to only one fate for African Americans. "In vital capacity," he wrote, "the tendency of the Negro race has been downward. This tendency must lead to a still greater mortality. And in the end, cause the extinction of the race."

Hoffman's Race, Traits and Tendencies of the American Negro was published in 1896, the same year the Supreme Court legalized segregation. It was one of the most influential publications of its day.

HAMMONDS: What's interesting is that it resonated in the minds of so many other social observers of the time, the extinction thesis. It, it fit into their notions of how, uh, races become ascendant in the world. They looked at other groups of people in various stages beneath them as approaching the completely civilized stage.

NARRATOR: Hoffman presented his statistical data as unimpeachable science. He compared rates of death and disease between African Americans and whites, and, not surprisingly, found enormous disparities. But his data analysis was flawed. He ignored the insidious effects of poverty and social neglect on health.

In contrast to today's belief in Black physical superiority, Hoffman concluded that African Americans were innately infirmed. As such, attempts to improve their housing, health and education would be futile. Their extinction was inevitable, encoded in their blood.

Racial purification was one aim of the Eugenics movement. The science of eugenics rested on simple Mendelian genetics. One gene each from father and mother, it was believed, gave rise to any trait, physical, behavioral, even moral.

GRAVES: Some of these things were things like the ability to play chess, rowdiness, congenital feeble mindedness. Um, uh, virtually any cultural or behaviorial trait you could imagine. Now, the mistake that they were making was assuming that complex behaviors could be reduced to simple Mendelian genes.

NARRATOR: Nonetheless, eugenicists used the science of the day to advance a social agenda widely accepted in white America - to breed the best and the brightest, always white, and breed out society's worst and weakest of all colors.

HAMMONDS: There's a lot of concern about race mixing. You don't want a superior race, a race with great qualities of intellect and achievement and musical genius, and these kinds of things, to mix with a race on a lower stage of civilization that has fewer of these characteristics because that again would bring down the level of those characteristics and what you want to have for your civilization.

NARRATOR: What you did not want for your civilization was found in the Blue Hills of Virginia. Mongrel Virginians. Mixed race. Unclassifiable, and worse, able to pass for white, circumvent segregation laws and breed into the white race.

They were called the WIN Tribe for their white, Indian and Negro ancestry. "A combination of the worst racial traits, a badly put together people", said Charles Davenport, leader of the American Eugenics movement.

To keep America's mongrels at bay, eugenicists proposed a series of restrictive measures unthinkable today. Yet they were adopted within and outside of America. Taken to their extreme, they fueled one of the century's greatest horrors.

GRAVES: The Nazi propaganda machine pointed out that their eugenic policies were entirely consistent and in fact derived from, ideas of American race scientists.

NARRATOR: At the 1936 Olympics in Berlin, Hitler's Aryan race was to have confirmed its place at the top of nature's hierarchy. But the star of the games would shatter those expectations.

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As a child, Jesse Owens had been chronically ill, destined it seemed to fulfill Hoffman's extinction thesis. Until a teacher intervened. "When he first asked me to go out for the track team in fifth grade," Owens wrote in his autobiography, "it wasn't because he saw any potential champion in me; it was because he saw a potential corpse."

How could a society steeped in the science of racial inferiority reconcile itself to Owens's four gold medals? By conceding innate athletic superiority to African Americans while denying them so-called civilized capacities. In the words of American team coach Dean Cromwell, the Negro athlete excelled because he was "closer to the primitive…it was not so long ago that his ability to sprint and jump was a life and death matter to him in the jungle."

ANNOUNCER (in film clip): To Owens, star of the squad, go the laurels of the champion.

JESSE OWENS (in film clip): The competition was grand, and we're very glad to come out on top. Thank you very kindly.

A flurry of debate between racial scientists and those contesting their assumptions greeted Owens's accomplishments.

GOODMAN: With the rise of the great Negro athletes in the 1930s, it became this question that there must be a reason that they're great, and that that reason must reside in biology rather than in, in culture or history or circumstance. And Jesse Owens was picked apart.

HAMMONDS: When the African American anthropologist and physician Montague Cobb is trying to explain why Jesse Owens was such an outstanding track star, he does so by talking about his body. He talks about his feet, he talks about his legs, his calves, his chest capacity. And he comes to the conclusion, of course, that, you know, you can't say that Negroes have some special characteristics that make them more fit as runners.

NARRATOR: Among the few who challenged racial science, Cobb wrote, "There is not one, single, physical feature, including skin color, which all our Negro champions have in common which would identify them as Negro."

But what marker would identify them as Negro, in the first place. Jackie as Asian? Noah as white? Gorgeous as Black?

GOODMAN: Think about race in its universality. Where is your measurement device? There is no way to measure race. We sometimes do it by skin color, other people may do it by hair texture - other people may have the dividing lines different in terms of skin color. What is black in the United States is not what's black in Brazil or what's black in South Africa.

STEPHEN JAY GOULD, Paleontologist: My favorite trivia question in baseball is which Italian-American player for the Brooklyn Dodgers once hit 40 home runs in a season and no one ever gets it right, because the answer is Roy Campanella, who is as Italian as he was Black. He had an Italian father and a Black mother, he's always classified as Black. You see, American racial classification is totally cultural. Who's Tiger Woods? Who's Colin Powell? Colin Powell's as Irish as he is African. Being Black has been defined as just looking dark enough that anyone can see you are.

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HAMMONDS: When I was a child, one of the things my father bought me was a set of Time-Life books on science. And a book on evolution had in it a skin color scale that went from one to thirty-six. And I would spend hours putting my arm against the scale in the book, the picture in the book, trying to figure out what number my color was. And I couldn't quite find myself on the scale.

GORGEOUS: You can be either 19 or 20.

STUDENT: Who would be this color, you or me?

GOREOUS: Let me say me.

MARCUS: I'd say that Jon and Noah, both white by appearance, and Jackie and I both fit under the Asian classification. But I guess the thing that surprised me was with the skin color test, you know, what should you technically call the entire group.

JON: I would never know that all our, all our skin colors are so similar.

JACKIE: I bet I match you.

JON: Exactly, like we match.

MARCUS: Should you call them all white or should you call them eleven to fifteen? You know?

NOAH: I'm white.

NOAH: Would I trade my skin color?…um…I probably wouldn't trade my skin color. It's something that I've taken for granted. It's also a privilege, I guess.

NOAH: I think 13 is closer.

STUDENT: Wow, we're like all 13.

NOAH: There's no profit in denying it, that, um, that there is a certain advantage to being white.

GORGEOUS: It's not why I'm B negative, you know what I'm saying.

NARRATOR: We all have the same 35,000 or so genes, but over time mutations cause variations in our DNA. Today, some genes, like those for skin color, come in different forms.

MARY-CLAIRE KING, Geneticist: In a few genes that control the colors of melanin in our skin, different alleles, different mutations occurred that were positively selected so that many of us with very light skin lost the capacity to make dark melanin.

NARRATOR: Dark melanin blocks out some ultraviolet light and is found where sunlight is intense. Lighter melanin is found where sunlight is less intense. Scientists debate why this is.

KING: One hypothesis is that it happened because sunlight is essential to have adequate vitamin D. In northern latitudes with very little light during the winter, one needed every bit of light that one could capture in order to be able to have adequate, active vitamin D. And children in particular, would need to have, would need to be able to absorb into their skin enough light to have vitamin D present to keep them healthy.

GRAVES: The best way to understand the genetic differences that we find in human populations is that populations differ by distance, and it's a continuous change, um, from one group to another. And one way we can look at this is use the example of skin color. If we were to only look at people in the tropics and people in Norway, we'd come to the conclusion that there's a group of people who have light skin and there's a group of people who have dark skin. But if we were to walk from the tropics to Norway, what we would see is a continuous change in skin tone. And at no point along that trip would we be able to say, "Oh, this is the place in which we go from the dark race to the light race.

GOODMAN: Human biological variation is so complex. There is so many aspects of human variation. So there are many, many ways to begin to explain them.

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NARRATOR: Variation in some traits. Like eye shape, hair texture, whether or not your tongue curls, involves very few genes. And even those genes haven't all been identified.

Variation in traits we regard as socially important is much more complicated. Differences in how our brains work, how we make art, how gracefully we move.

Genes may contribute to variation in these traits, but to the extent they do, there would be a cascade of genes at work, interacting with each other and the environment, in relationships so intricate and complex, that science has hardly begun to decipher them.

LEWONTIN: People are always talking about genes for things, the genes for athletic ability, the genes for making money, the genes for intelligence. And you have to be very careful. Even when there are genes that influence those things, to talk about it as genes for them is not so clear.

OSSORIO: What makes us different is both those genetic differences that we have between us and also the interaction of that genome with the environment, and the environment is a very, very complicated thing. So when I say, I sort of mean the environment writ large, everything from the environment in the womb to the environment in your school.

NARRATOR: In the urban environment of the 1930s, Jewish teams dominated American basketball. Sons of immigrants, theirs were the hoop dreams of the day.

GRAVES: And it was said that the reason that they were so good at basketball was because the, the artful dodger characteristic of the Jewish culture made them good at this sport. There are strong cultural aspects of what sports individuals choose to play that has to do with the interaction of individual genetic background of opportunity and training. History shows us, that as opportunities change in society, different groups get drawn into sporting arenas.

NARRATOR: By 1992, America's Olympic Dream team was almost completely African American. Ten years later, almost 20% of NBA starters would be foreign born. The top NBA draft pick? Chinese.

GRAVES: We can't come to any fast hard rule about how, uh, genetic ancestry is going to influence the ability of an individual to perform an athletic event. So I don't think we're ever going to be able to isolate a gene for athletic performance.

NARRATOR: Or a gene for any complex trait. If genes contribute to Marcus' musical talent, there would be dozens, interacting with environment, training, and practice. Those genes would be inherited independently of the genes for eye shape, skin color and hair form which Marcus inherited through his Korean - and Jamaican ancestors.

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GOODMAN: For race to be more than skin deep, one has to have concordance. In other words, skin color needs to reflect things that are deeper in the body, under the skin. But most of human variation is non-concordant. Skin color or eye color or hair color is not correlated with height or weight. And they're definitely not correlated with more complex traits like intelligence or athletic performance.

KIRIL (off-camera): Wait, who is the person you said was going to be most similar? Jamil right?

GORGEOUS: Yeah, what's his number?

KIRIL: He's 34.

NARRATOR: The tools of modern genetics allow the students to explore the idea of race and concordance. From the beginning, they believed they would be most similar genetically to those whose racial ancestry they believed they shared.

KIRIL: Who did you say was going to be most different?

GORGEOUS: Noah, and he's...

KIRIL: 9.

GORGEOUS: 9

NARRATOR: They have now sequenced a small loop of their mitochondrial DNA.

KING: If we want a very fine scale for assessing how similar we are to each other, person by person, we can do that by sequencing that small bit of mitochondrial DNA.

NARRATOR: mtDNA is a second set of DNA, found at the cell's mitochondria. It does not code for any traits, and is inherited only from our mother.

KING: Now, what will it tell us? It will tell us a whole lot about one of our ancestors, our mother's mother's mother's mother's mother.

NARRATOR: The students' mtDNA appears as the letters A, C, T, and G, representing the four nucleotides that define our DNA. The students are sampling a small sequence, about three-hundred and fifty letters long. They find that most of it is identical, one to the other. What is not, is highlighted in yellow.

GORGEOUS: Cause I'm different. I'm, I'm really different.

NARRATOR: Jamil thought he'd have the fewest mtDNA differences with Gorgeous.

JAMIL: I was more like Kiril than I was than Gorgeous. She has like twelve differences, and like Kiril is like a white, tall, blond…from Russia, and, and, and, like, we seem completely different but it's less differences.

JON: But I think it's hard to tell because we don't...

NARRATOR: Jon thought he'd have fewest differences with Kiril and with Noah. In fact, Jon discovered that he had the same number of differences with Kiril as he had with Jackie, only three.

GORGEOUS: I don't think mine is going to show up close with anybody.

NARRATOR: If human variation were to map along racial lines, people in one so-called race would be more similar to each other than to those in another so-called race.

That's not what the students found in their mtDNA. What about other genetic differences?

LEWONTIN: The problem for evolutionists and population geneticists was always to try to actually characterize how much genetic variation there was between individuals and groups. And I spent a lot of time worrying about that, like other people in my profession.

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NARRATOR: In the 1960s, Richard Lewontin decided to find out just how much genetic variation fell within, and how much between, the groups we regard as races. A new technology enabled him to do pioneering work.

LEWONTIN: And that method, which is called gel electrophoresis, a very fancy name, uh, we were able to use on any organism at all. If you could grind it up, you could do it. Uh, that included people, I mean, you don't have to grind the whole person, but you could take a little tissue, or blood.

Over the years, a lot of data were gathered by anthropologists and geneticists looking at blood group genes, and protein genes, and other kinds of genes from all over the world. I mean, anthropologists just went around taking blood out of everybody. Uh, uh, I, I must say, if I were a South American Indian, I wouldn't have let them take my blood. But uh, but they did, and so, I thought, 'well, we've got enough of these data, let's see what it tells us about the differences between human groups.'

NARRATOR: Lewontin's findings were a milestone in the study of race and biology.

LEWONTIN: If you put it all together, and we've now got that for proteins, for blood groups, and now with DNA sequencing, we have it for DNA sequence differences, it always comes out the same. 85% of all the variation among human beings is between any two individuals within any local population. Between individuals within Sweden, or within the Chinese, or the Kikuyus, or the Icelanders.

NARRATOR: To put it another way, of the small amount of variation in our genes, there is apt to be as much difference between Gorgeous and her teammate Christine, as there is between Gorgeous and her opponent Kaylin. Any two individuals within any so-called race may be as different from each other as they are from any individual in another so-called race.

OSSORIO: Are the people who we call Black more like each other than they are like people who we call white, genetically speaking? Um, the answer is no. There's as much or more diversity and genetic difference within any racial group as there is between people of different racial groups.

NARRATOR: Still we know that some genes are found with greater frequency in some populations.

GOODMAN: And geography is the better way to explain that more than race or anything else. There can be accumulations of genes in one place in the globe and not another.

(01:39:02)

NARRATOR: Like the gene forms regulating skin color. And for some genetic diseases, like sickle cell disease. Long assumed to be a racial trait, sickle cell disease is a debilitating disorder caused by a gene form that alters the shape of red blood cells.

ERIC NISBET-BROWN, M.D.: It's one of the misconceptions that sickle cell disease is an African-American or an African disease. The sickle cell trait is not uncommon in people from the, in people from the Mediterranean region. In fact, in some parts of Greece, up to 30% of people in the population may carry sickle cell trait. Sickle cell trait persists in certain populations around the world because of the relative resistance it confers to malaria. So people who've got sickle cell trait are less likely to develop malaria and when they do develop it, they are less likely to develop severe complications and to die from it.

NARRATOR: Where malaria was common, the sickling gene was selected. In Arabia, South Asia, Central and Western - but not Southern Africa. And in the Mediterranean basin, the home of Jackie Washburn's ancestors. Thought to have originated only a few thousand years ago, sickle cell is not a racial trait. It's the result of having ancestors who lived in malarial regions.

Race does not account for patterns of genetic variation. Our recency as a species and the way we have moved and mated throughout our history, does. Our human lineage originated in Africa. About two million years ago, small groups of early hominids - not modern humans -- began a first migration out of Africa to the far reaches of the globe, breeding isolated lineages. It was long thought, and is still believed by some, that those first lineages led to genetically distinct races that are with us today.

GOULD: It turns out that's not true. I think there's almost genetic proof now - I wouldn't say the issue is totally resolved -- that those lineages just died out. That Neanderthals in Europe died. That homo erectus in Asia died. That there was a second migration of our modern species homo sapiens, and that all modern humans are products of the second migration, which is probably less than a hundred thousand years old, by the best current evidence.

GOODMAN: Some of those movements may follow major migrations as agricultural people came into Europe, as people crossed the Bering Strait and came into the Americas.

But, other movements are much more subtle. They're smaller groups of individuals that moved, or their genes moved from place to place, and time to time.

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We've had maybe a hundred thousand years of having genes move out and mix and re-sort in countless different ways.

NARRATOR: A hundred thousand years may seem like a long time, but in evolutionary terms, it is a blink of the eye. Human populations have not been isolated from each other long enough to evolve into separate subspecies.

GOULD: There just hasn't been time for the development of much genetic variation, except that which regulates some very superficial features like skin color and hair form. For once, the old cliché is true. Under the skin, we really are effectively the same. And we get fooled, because some of the visual differences are quite noticeable.

NARRATOR: The superficial traits we use to construct race are recent variations. By the time they arose, important and complicated traits, like speech, abstract thinking, even physical prowess, had already evolved.

KING: As geneticists, we now have the opportunity to investigate, using proper genomic analysis, complex human traits: athletic ability, musical ability, intelligence, all these wonderful traits that we wish we understood better and for which we'd very much like to know if there are genes that are involved, how they interact, how they play out. Those traits are old.

We spent most of our history, as a species, together in Africa in small populations before anyone left. There's far more of us now than those small, original populations that founded our species. Each of us carries with us some very recent variation and some common, shared variation that goes way back in human history.

NARRATOR: Variations among us in those old traits developed independent of and non-concordant with variations in the recent, superficial traits we think of as racial. Human variation does not map onto what we call race. No matter how we might measure it.

BRONSON: So now it's going to this gigantic database of DNA. And you're going to blast this database with your DNA sequence, and it's going to pull up anything that's significantly similar. And now...

NARRATOR: The final exercise of the DNA workshop, offered the students further evidence of the genetic variation within groups. They compared their mitochondrial DNA sequences with an international database.

BRONSON: One, two, three, four differences...

NARRATOR: Gorgeous's sequence was most similar to that of a Yoruban individual in Nigeria.

GORGEOUS: That's the closest person.

BRONSON: And that's, you were saying that's the closest person that you'd match up. Now does that necessarily mean you're Yoruban?

GORGEOUS: No.

BRONSON: No. It just means that there's somebody in this part, whoever, in this part of the world, has a very similar DNA sequence to you.

GORGEOUS: O.K.

BRONSON: And remember, if we look at other people within this Yoruban group, I expect to see other forms of mitochondrial DNA.

NARRATOR: And they did. Her match was dramatically different from another Yoruban's, whose DNA sequence was very different from still other Yorubans. Because modern humans first evolved in Africa, there is even greater genetic diversity in Africa than elsewhere.

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GRAVES: So, if there were a catastrophe which destroyed the rest of the world's population, most of the genetic variability in the world would still be present in sub-Saharan Africans.

NARRATOR: Genetic data, can subvert racial assumptions about racial ancestry.

BRONSON: We'll look and see how many differences, we see one...

NARRATOR: Jackie's data search matched her with a sequence from an individual in the Balkans.

BRONSON (off-camera): So you were expecting something maybe more Japanese?

JACKIE: Yes, definitely something more Japanese instead of Balkan. At all.

NOAH: If I actually know my maternal lineage, like I know where it should end up, doing a search like this should double-check it, right?

BRONSON (off-camera): What's your preconceived notion?

NOAH: My preconceived notion is, um, we know back from my great-great-great grandmother, and she had lived in Eastern Europe her whole life in the Austro-Hungarian Empire in a little town in the Ukraine, as far as I understand.

BRONSON (off-camera): But remember this little town in the Ukraine may have many different mitochondrial DNA sequences within it. So let's go back and we'll look at yours. And isolate from the Balkans. Not a major shock there. Uh, let's see how similar you are to that person.

NOAH: And we had always guessed that my great grandmother had been this nice little farm girl who had spent her whole life in the Ukraine. And so I was pretty sure that I should be a pretty exact match to one of those ethnic groups, and I was. 100% match.

BRONSON: So I'm going to compare you with someone in Iceland.

NOAH: Wow. Yeah, again, huh...

NOAH: We also pulled up a sequence from Iceland. And we pulled up a third sequence from somewhere in Africa, and I was also a 100% match.

BRONSON: That's a 100% match. That's very significant. Um, and...

NOAH: That's weird.

BRONSON: Well, what it's showing you is not, that you're closely related to this person, may-, possibly, mitochondrially speaking, and that we're all very closely related...

NOAH: So that somewhat shocked me, actually, that there were so many of these racial groups that shared it. I'm just a mutt so to speak. I've been crossbred and inter-bred with lots of different ethnic groups.

BRONSON: Let's see if it gets more interesting than we think.

GOODMAN: I think the way to think about things is that we're all mongrels, we've always been mixing, every single one of us is a mongrel.

NARRATOR: Today's genetic findings corroborate Richard Lewontin's genetic findings of thirty years ago. Because of our history of moving, mating, and mixing, most human variation, especially that of older complex traits, can be found within any population. Most of it from a common source: in Africa.

GOULD: We have now understood genetic variation in human beings. I'm not saying our knowledge is fixed for all time - it never is, but I think we have seen just how shallow and superficial the average differences are among human races even though in certain features like skin color and hair form the visual differences are fairly striking. They're based on almost nothing in terms of overall genetic variation.

GOODMAN: Race as biology simply doesn't work, but what is important is that race is a very salient social and historical concept, a social and historical idea. We live in racial smog.

(01:50:36)

OSSORIO: Just because race isn't something biological, that doesn't mean it's not real. There are a lot of things in our society that are real and are not biological. Race as we understand it, as a social construct, has a lot to do with where somebody will live, what schools they will go to, what jobs they will get, whether or not they will have health insurance.

NARRATOR: Black, white and brown are merely skin colors. But we attach to them meanings and assumptions, even laws, that create enduring social inequality.

NOAH: When I'm walking the streets alone at night, coming home from parties and stuff, I never get a sideways glance at people asking what I'm doing there. If a woman is stumbling with her shopping bags and I stop and say, 'would you like a hand?' I never get a sort of a glance with two meanings it's always, 'Oh nice white boy you can help.'

GRAVES: On my own campus, uh, when I walk to classes, students often come up to me and ask me if I'm the football coach or the basketball coach, and I tell them, 'No, I am a professor in the department of Life Sciences.'

HANNAH: It's easy to be white, it's very easy to be white. It's never been easy for Africans or African Americans here, never. It's been a long, long time, you know, since, the abolition of slavery, you know, African-American slavery, in, in this country. It doesn't matter. It doesn't matter, those ideas are still around.

NARRATOR: No matter how they view themselves, the world sees Jackie, Gorgeous and Jon as separate races. The social expectations that await them are in many ways dependent upon that racial assignment.

Would our expectation about Gorgeous be that she is a champion athlete, or valedictorian of her class? In fact, Gorgeous is both. But since the days of Jesse Owens, our society has more readily acknowledged and more avidly rewarded one of her talents over the other.

If the playing field were level, the array of opportunities open to Gorgeous and her teammates would not be limited by assumptions society makes about the nature of the genes they inherited.

KING: Lots of things are inherited that don't have anything to do with genes. Money is inherited. And money goes a long way in increasing someone's capacity to do well in one area or another.

NARRATOR: Off the track, the playing field is not level. The net worth of the average white American family is eight times that of the average African American family.

HAMMONDS: Race is a concept that was invented to categorize the perceived biological, social, and cultural differences between human groups.

(01:54:12)

LEWONTIN: And the beauty of that ideology is that it justifies what is the greatest, uh, social agony of American life, namely, it justifies the inequalities that exist in a society which is said to be based on equality.

HAMMONDS: Race is a human invention. We created it, we have used it in ways that have been in many, many respects quite negative and quite harmful. And we can think ourselves out of it. We made it, we can unmake it.

NARRATOR: The racialized society we live in has been under construction for three centuries. How can we unmake race unless we first confront its enormity as a historical and social reality, and its emptiness as biology?

END

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