Behaviour and Genetic Determinism

Alvina Adimoelja, TA
(she/her)

Naoimi Nhen Hunter, TA
(she/her)

Daphne Martschenko
Guest Speaker
(she/her)

Learning Goals

- Recognize how genetics research can be misused to justify genetically deterministic and essentialist viewpoints and the associated impacts

- Describe current efforts by the research community to combat the misuse/misinterpretation of research, and articulate strategies that individual scientists can employ

Ground Norms

- Be respectful of conflicting opinions
- Commit to learning and growing
- Compassionate listening
- No talking over anyone
- Make space, take space
- What is said in the room, stays in the room (confidentiality)
- Use “I”statements for sensitive topics
- Don’t equate people with stereotypes
- Don’t rush to judge others

Introduction to Genetic Determinism

Sensitive Topics Acknowledgment

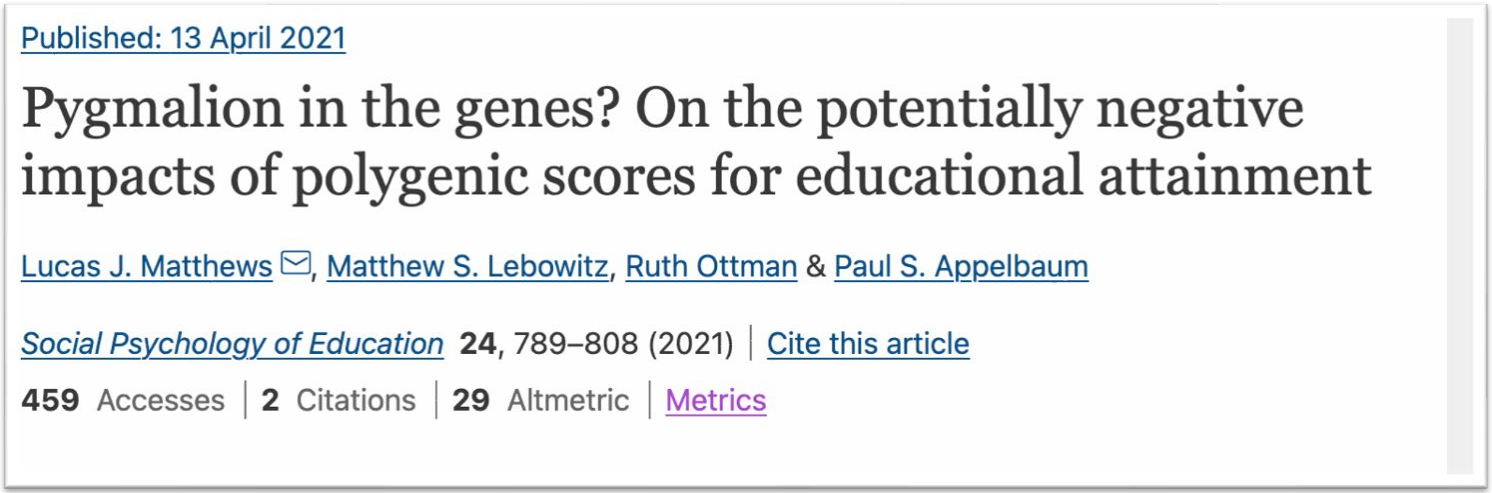
It’s okay to take a break or step away and take care of yourself.

Today will cover some difficult topics that may bring up the racially motivated mass shooting in Buffalo, NY.

Please prioritize your well-being and check in with yourself. Step outside, take a break, take a deep breath, do what is best for you in processing.

Definitions

Genetic Determinism: The tendency to infer a person's characteristics and behaviors as based on their perceived genetic make-up (Dar-Nimrod & Heine, 2011). The tendency to think of genetic attributions as being fixed, immutable, and "dividing people into homogenous and discrete groups" regardless of time or context (Heine et al., 2017, p. 137).



Published: 13 April 2021

Pygmalion in the genes? On the potentially negative impacts of polygenic scores for educational attainment

Lucas J. Matthews ✉, Matthew S. Lebowitz, Ruth Ottman & Paul S. Appelbaum

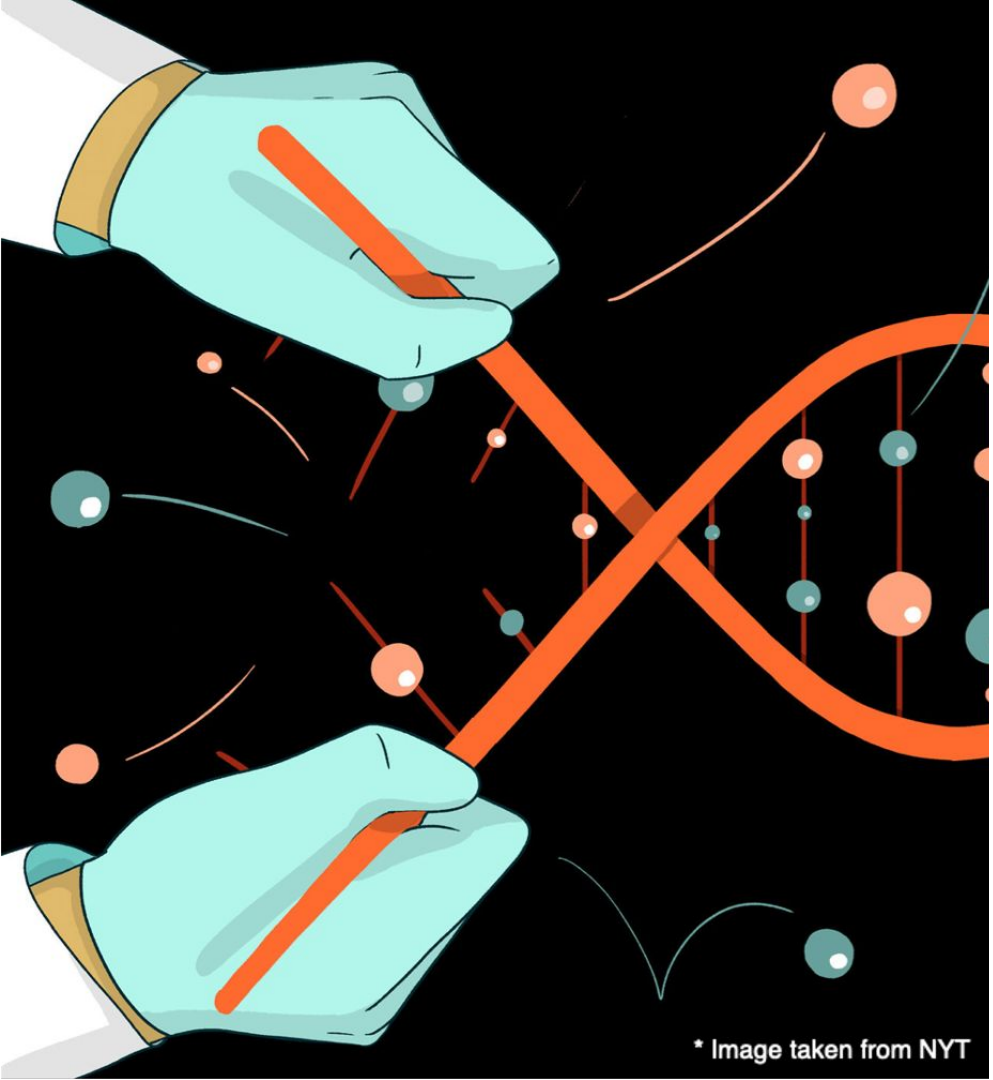
Social Psychology of Education **24**, 789–808 (2021) | Cite this article

Participants prompted to answer multi-choice questions as though they had received their own low-percentile score, compared to a control condition, scored significantly lower on measures of self-esteem and of self-perceived competence, academic efficacy, and educational potential.

Definitions

Genetic essentialism: A reductionist view of human beings and their behavior as essentially consisting of their genes (Australian Law Reform Commission, 2010)

Racial genetic essentialism: The belief that racial groups and their defining core essences are determined by genes (Yaylacı et al, 2019)



Conflation of genetic ancestry and race

Genetic ancestry tests (GATs) have been shown to shape a person's racial self-identification in ways that vary across race, sociocultural context, and other characteristics (Guo et al. 2014; Johfre, Saperstein, and Hollenbach 2021; Nelson 2008).

1 in 5 individuals surveyed said that their racial identity changed after receiving their GAT results (Roth and Lyon 2018).

GATs are increasingly being used by lay-people as 'proof' of racial membership (Brubaker 2016b; Morning 2018).

Definitions

Strategic essentialism: Genetic essentialism is strategically rather than uniformly practiced (Condit, 2019). People draw upon multiple categories and causal factors in strategic ways based on the context (Condit, 2019), making them strategic essentialists.

Stephen Voss, taken from Politico

THE SOCIAL LIFE OF DNA

RACE, REPARATIONS, AND RECONCILIATION AFTER THE GENOME

Alondra Nelson

"Eye-opening, provocative, and deeply humane."
—Isabel Wilkerson

Activity: discussion

(10 mins) Group reading, led by Daphne

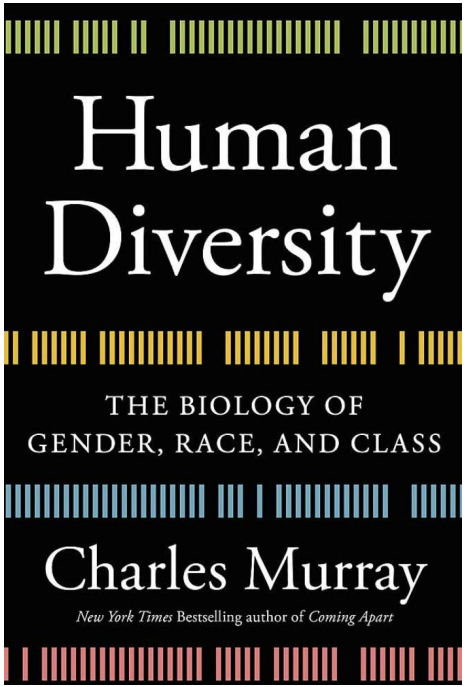
(10 mins) Large group share out

- In each of the two readings, are there examples of genetic determinism or essentialism? What are they?
- To your knowledge, what have researchers done to combat the misuse or misinterpretation of their research? Do you think they could do more?

Group reading pt. 1

“We’re just constrained in whom we can help with what kinds of problems. If instead we try to change people who aren’t ready and able to change given the opportunity, we’re back to a situation in which powerful competing forces, acting through both genes and the nonshared environment, overwhelm the magnitude of the intervention that seeks to produce change. Expecting to see a major impact from outside interventions is usually unrealistic.” (Murray, 2020, p. 287)

“An acceptance of the constraints imposed by human nature should guide the administration of the civil and criminal justice systems, the regulation of business, the powers granted to bureaucrats—the operations of just about every social, cultural, economic, and political institution.” (Murray, 2020, p.353)



Group reading pt. 2

Excerpt from Buffalo shooter's manifesto:

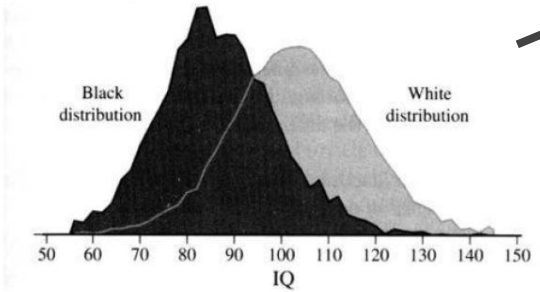
Blacks are considered to be the same species of human as all other races, which is true since they can interbreed and have fertile children. But I would argue that they are a different subspecies of human. Whites and Blacks are separated by tens of thousands of years of evolution, and our genetic material is obviously very different. Physical factors are the most distinguishable difference, such as noticeable differences in skin pigmentation, fat storage, bone and skull shape and length, and differences in brain size, most notably in the prefrontal cortex.

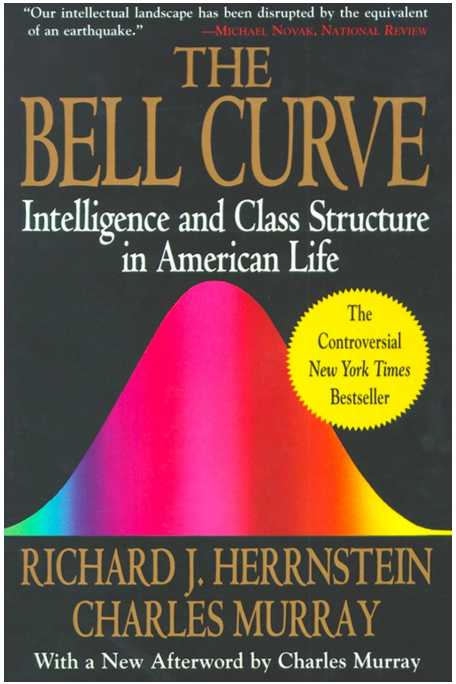
Physical traits do not matter that much in the society of advanced human civilization. It has mattered in the past when humans had to plow the land and relied on their physical abilities to do work. But in this age of technology physical attributes matter less and less. I believe that the most important part of a human is the brain. The human brain is an amazing tool and is the reason why we as humans are predators of all and prey of none. It is obvious that people differ in cognitive abilities, this is undeniable and a proven fact. People with a "higher intelligence" often succeed in life by getting higher education and more professional careers, which often leads to greater contributions to human development in their lifetime. There is an undeniable difference between the brains of races and I will be explaining some of the differences below.

1: Intelligence and Genetics

The black and white IQ distributions in the NLSY, Version I

Frequency distributions for populations of equal size





(1994)

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"We're just constrained in whom we can help with what kinds of problems. If instead we try to change people who aren't ready and able to change given the opportunity, we're back to a situation in which powerful competing forces, acting through both genes and the nonshared environment, overwhelm the magnitude of the intervention that seeks to produce change. Expecting to see a major impact from outside interventions is usually unrealistic." (Murray, 2020, p. 287)

"An acceptance of the constraints imposed by human nature should guide the administration of the civil and criminal justice systems, the regulation of business, the powers granted to bureaucrats—the operations of just about every social, cultural, economic, and political institution." (Murray, 2020, p.353)

Group reading: Genetic Determinism

“It is not within our power to do much to change personalities or abilities or social behaviors by design on a large scale…School systems in large urban areas are notorious for tolerating chaotic classrooms in a handful of schools in the most impoverished part of town. There’s no excuse for it. Children who are eager to learn are prevented from doing so, with lifelong consequences, and yet an outside intervention can completely cure that problem in a day: Install strict rules of in-class conduct, and promptly and without exception eject disruptive students from the classroom. Teachers will be able to teach and the remaining students will be able to learn.

The difficulty, of course, is what to do with the students who have been ejected. Solving their problems is a matter of changing their personalities, abilities, or social behavior, or a combination of all three, and that’s what the first premise of the syllogism says we don’t know how to do. (Murray, 2020, p. 286)

We’re just constrained in whom we can help with what kinds of problems. If instead we try to change people who aren’t ready and able to change given the opportunity, we’re back to a situation in which powerful competing forces, acting through both genes and the nonshared environment, overwhelm the magnitude of the intervention that seeks to produce change. Expecting to see a major impact from outside interventions is usually unrealistic. (Murray, 2020, p. 287)

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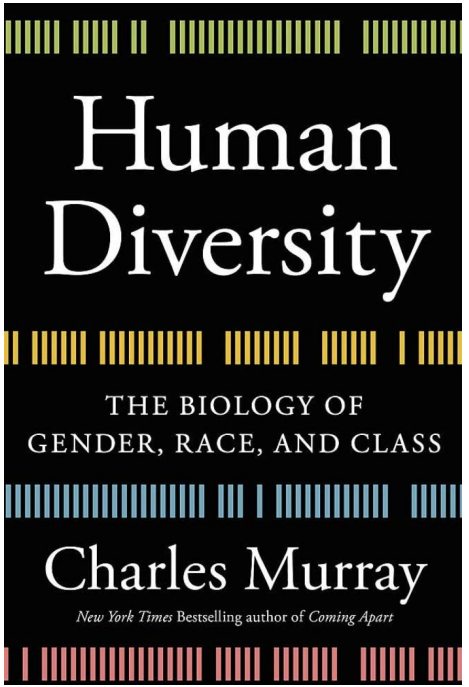

Activity: discussion

(10 mins) Large group share out

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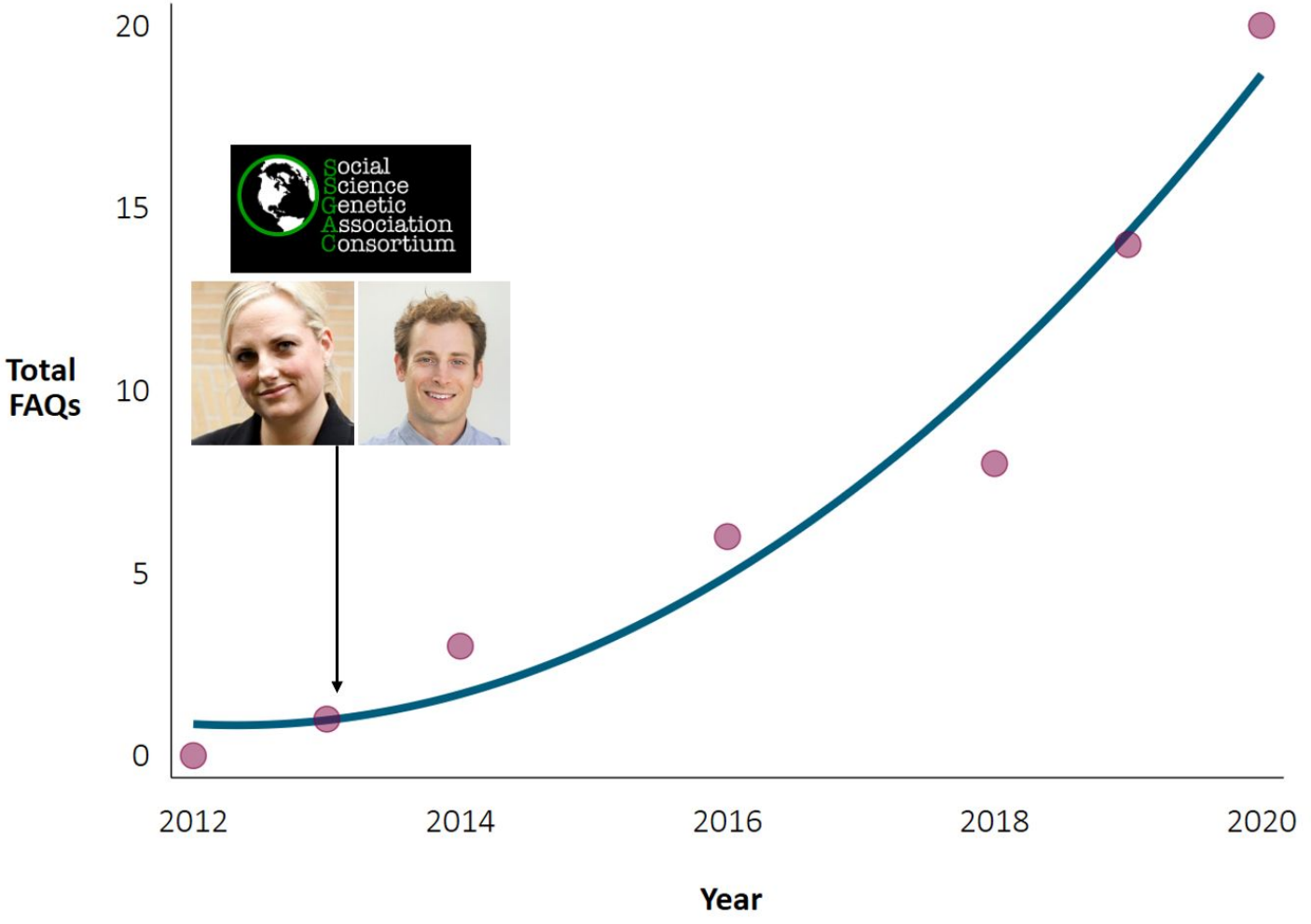
comment

Check for updates

FoGS provides a public FAQ repository for social and behavioral genomic discoveries

Here we introduce 'FAQs on Genomic Studies' (FoGS), an open-access repository of explanatory documents that accompany genomic analyses in social and behavioral genomics. For fields such as social and behavioral genomics that are shaped by an ugly history and uncertain future, socially and ethically responsible research and research communication are crucial. FoGS amplifies one such approach towards responsible research communication.

Daphne Oluwaseun Martschenko, Benjamin W. Domingue, Lucas J. Matthews and Sam Trejo


20
15
10
5
0
Total FAQs
Social Science Genetic Association Consortium
2012
2014
2016
2018
2020
Year

Genetic Associations with Mathematics Tracking and Persistence

What did the study examine? This study examined the relationship between individuals' genetics and progress in high school mathematics courses as shown by difficulty of the math courses they took and persistence in studying math. Link to the study.

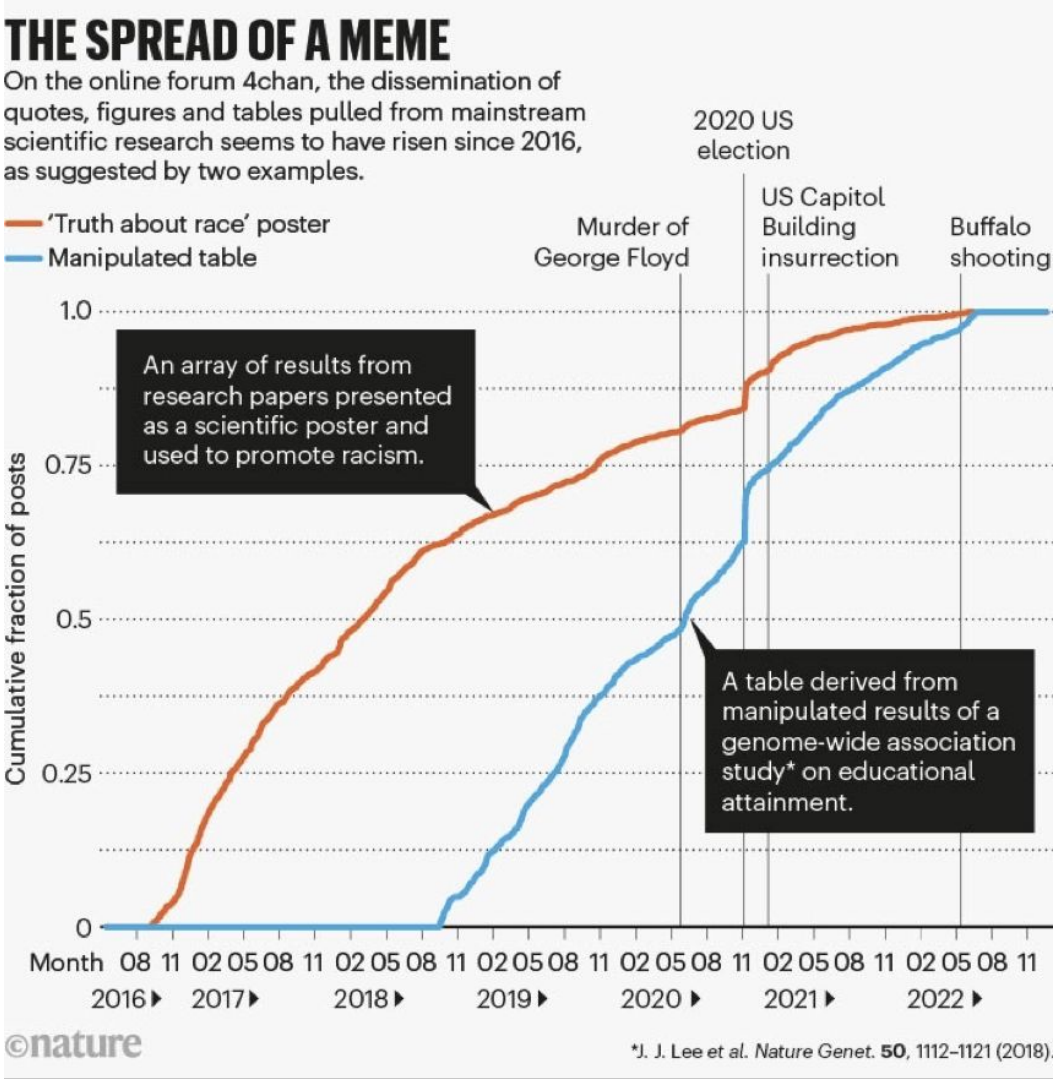
What year was it published? 2020

Key findings:

1. On average, students with more education-related genetic variants took more advanced math classes in the 9th grade.
2. On average, students with more education-related genetic variants stayed in math for longer.
3. Students with fewer education-related genetic variants were less likely to drop out of math if they attended a school where most parents had graduated from high school, demonstrating the importance of social and environmental factors.

Corresponding author of FAQ: K. Paige Harden (harden@utexas.edu)

Posting frequency of scientific memes increases following shootings and political events



Carlson et al, 2022

2018 GWAS on Educational Attainment

The latest findings on genetics and intelligence show that biological factors contribute to the gap in intelligence between European and African populations.

Recent studies have found **more than 200 genetic variants** that are:
present in at least one third of the European population [1],
at least 100% more common in Europeans than Africans [2],
known to **increase intelligence with genome-wide statistical significance** [3],
and known to **influence genes linked to the nervous system** [4].

More specifically, **genes linked to the hippocampus, brain, limbic system, central nervous system, cerebral cortex, cerebrum,** parahippocampal gyrus, telencephalon, temporal lobe, brain stem, prosencephalon, rhombencephalon, occipital lobe, **cerebellum, visual cortex, parietal lobe, retina, basal ganglia, neural stem cells, corpus striatum,** and **frontal lobe**

rs159428 (T) Europeans are **4192% more likely** to have this allele than Africans
rs589249 (A) Europeans are **658% more likely** to have this allele than Africans
rs602512 (A) Europeans are **388% more likely** to have this allele than Africans
rs604149 (A) Europeans are **403% more likely** to have this allele than Africans
rs685958 (A) Europeans are **733% more likely** to have this allele than Africans

[1] 1000 Genomes Project (2015). Superpopulations. Europeans.
[2] 1000 Genomes Project (2015). Superpopulations. Europeans. Africans.
[3] Nature Genetics 50, 1112–1121 (2018). Supplementary data. Tables 11, 12, 13, 15, 44. Edu Years excluded.
[4] Nature Genetics 50, 1112–1121 (2018). Supplementary data. Tables 6, 7.

https://www.ncbi.nlm.nih.gov/variation/tools/1000genomes/
https://www.nature.com/articles/s41588-018-0147-3/

According to the list above, Europeans populations are much more likely to have specific genes that are linked to the brain than Africans. These genes have a direct influence on expected behavior and brain development, which may have factors in the individual's expected fluid and crystallized intelligence.

The Buffalo shooter's manifesto included a pseudo-scholarly table showing that these variants from the 2018 GWAS were more common in Europeans than in Africans

SNP	Distribution
rs159428 (T)	Europeans are **4192% more likely** to have this allele than Africans
rs589249 (A)	Europeans are **658% more likely** to have this allele than Africans
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Slide credit: Jed Carlson

Tracing the origins of the EA3 table

<6 weeks after EA3 was published in 2018, the following thread was posted to 4chan:

20KiB, 597x519, heatenings.jpg

View Same | Google | iqdb | SauceNAO | Trace

HAPPENING Anonymous ID:nBM2I7K6 Sat 15 Sep 2018 19:15:02 No.185839794 View Reply Original Report [343 / 52 / 155]

Quoted By: >>185840173 >>185840858 >>185841179 >>185841680 >>185841796 >>185841875 >>185841921 >>185841961 >>185841990 >>185842063 >>185842129 >>185842146 >>185842154 >>185842203 >>185842225 >>185842262 >>185842429 >>185842541 >>185842641 >>185842775 >>185842959 >>185843023 >>185843033 >>185843190 >>185843275 >>185843352 >>185843465 >>185843475 >>185843586 >>185843588 >>185843817 >>185843900 >>185844059 >>185844068 >>185844306 >>185844350 >>185844505 >>185844676 >>185844680 >>185845216 >>185847200 >>185847956 >>185848275 >>185849120 >>185849207 >>185849493 >>185849950 >>185849960 >>185850552 >>185851398 >>185852172 >>185852655 >>185853237 >>185854054 >>185854427 >>185854584 >>185854848 >>185855177 >>185855552 >>185855643 >>185855846 >>185855996 >>185856712 >>185856870 >>185857321 >>185857731 >>185857806 >>185858768 >>185860847

For fuck's sakes /pol/

I found goundbreaking genetic evidence for racial differences but I can't do anything about it. If someone here is a scientist, go run the numbers and get it published at the risk of ruining your career but saving humanity.

There's a study that has thousands of genes associated with intelligence listed in their supplementary data. They studied 1 million individuals. Not only are the correlations insanely strong, but most of the genes codify for the nervous system, so it's almost undeniable.

The thing is, the study doesn't mention race or ancestry. So, I made a list of all the genes (there are a lot of tables, I went through all of them, and then removed the duplicates), and got their frequencies in different human populations from a famous database. I am too scared to even name them because I don't want all the information taken down, but any geneticist should know what I am talking about.

So I am running the numbers, and I wanted to see the correlation between Italians and Brits, and I got a result higher than 95%. That was okay, no big deal, no surprises there. Then I run the correlation for Nigerians (Yoruba) and Brits, and I was expecting maybe 85-90% at worst. I almost fall off my chair. The correlation was in the low 60%!

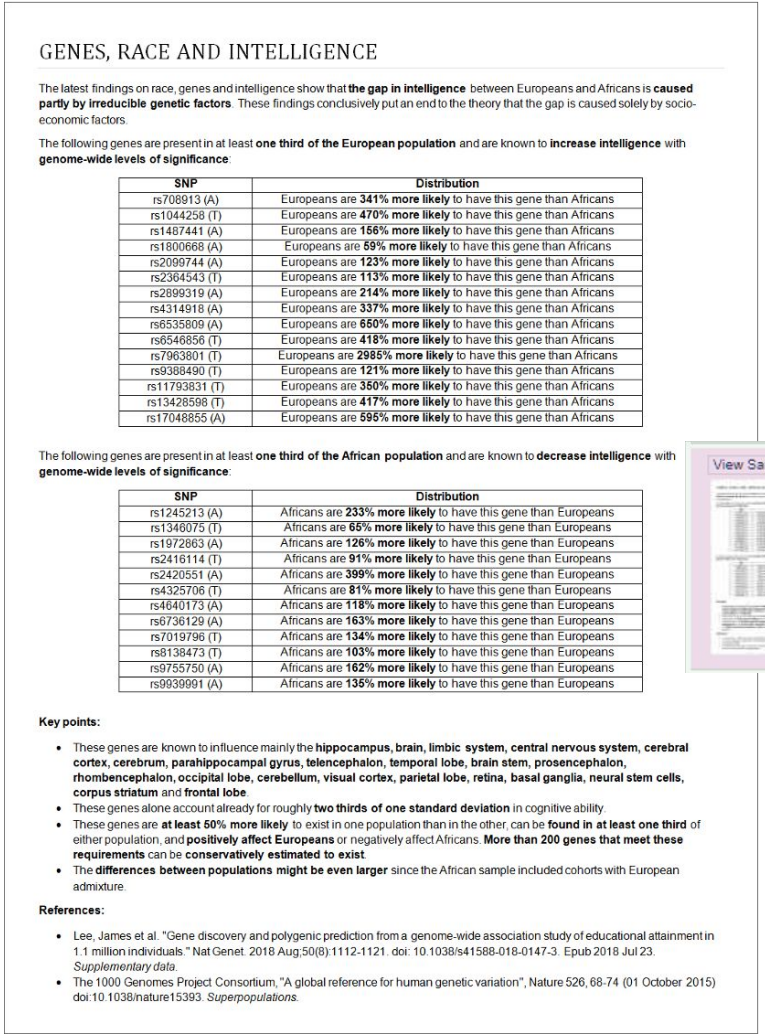
Ever heard how races are supposed to be 99.9% equal? That's true if you look at the hundreds of millions of genes that do nothing special and basically every single person has. But if you look at the thousands of genes known to influence intelligence, the variation is absolutely insane. Even I couldn't believe it. I used more than 4000 genes for anyone trying to replicate this.

I don't know what to do with this. I am not a scientist, I just got into this as a hobby. I don't want to publish my version of the database because I don't want the information to be tainted and be discredited for coming from 4chan. So please, build your own database, I will give you all the hints you need if you're a geneticist.

Slide credit: Jed Carlson

Tracing the origins of the EA3 table

September 15, 2018



GENES, RACE AND INTELLIGENCE

The latest findings on race, genes and intelligence show that **the gap in intelligence** between Europeans and Africans is **caused partly by irreducible genetic factors**. These findings conclusively put an end to the theory that the gap is caused solely by socio-economic factors.

The following genes are present in at least **one third of the European population** and are known to **increase intelligence** with **genome-wide levels of significance**:

SNP	Distribution
rs708913 (A)	Europeans are **341% more likely** to have this gene than Africans
rs1044258 (T)	Europeans are **470% more likely** to have this gene than Africans
rs1487441 (A)	Europeans are **156% more likely** to have this gene than Africans
rs1800668 (A)	Europeans are **59% more likely** to have this gene than Africans
rs2099744 (A)	Europeans are **123% more likely** to have this gene than Africans
rs2364543 (T)	Europeans are **113% more likely** to have this gene than Africans
rs2899319 (A)	Europeans are **214% more likely** to have this gene than Africans
rs4314918 (A)	Europeans are **337% more likely** to have this gene than Africans
rs6535809 (A)	Europeans are **650% more likely** to have this gene than Africans
rs6546856 (T)	Europeans are **418% more likely** to have this gene than Africans
rs7963801 (T)	Europeans are **2985% more likely** to have this gene than Africans
rs9388490 (T)	Europeans are **121% more likely** to have this gene than Africans
rs11793831 (T)	Europeans are **350% more likely** to have this gene than Africans
rs13428598 (T)	Europeans are **417% more likely** to have this gene than Africans
rs17048855 (A)	Europeans are **595% more likely** to have this gene than Africans

The following genes are present in at least **one third of the African population** and are known to **decrease intelligence** with **genome-wide levels of significance**:

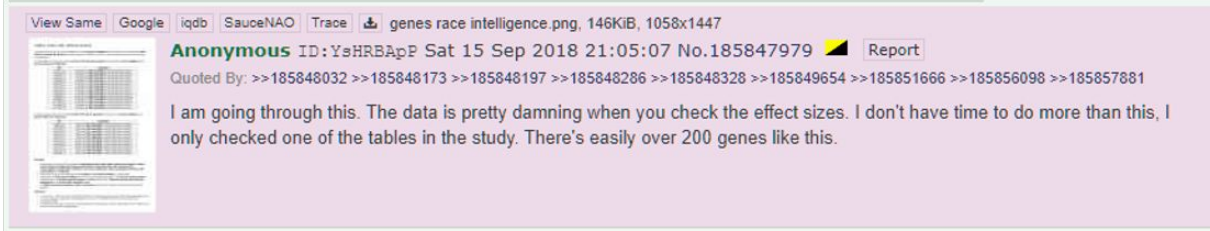
SNP	Distribution
rs1245213 (A)	Africans are **233% more likely** to have this gene than Europeans
rs1346075 (T)	Africans are **65% more likely** to have this gene than Europeans
rs1972863 (A)	Africans are **126% more likely** to have this gene than Europeans
rs2416114 (T)	Africans are **91% more likely** to have this gene than Europeans
rs2420551 (A)	Africans are **399% more likely** to have this gene than Europeans
rs4325706 (T)	Africans are **81% more likely** to have this gene than Europeans
rs4640173 (A)	Africans are **118% more likely** to have this gene than Europeans
rs6736129 (A)	Africans are **163% more likely** to have this gene than Europeans
rs7019796 (T)	Africans are **134% more likely** to have this gene than Europeans
rs8138473 (T)	Africans are **103% more likely** to have this gene than Europeans
rs9755750 (A)	Africans are **162% more likely** to have this gene than Europeans
rs9939991 (A)	Africans are **135% more likely** to have this gene than Europeans

Key points:

- These genes are known to influence mainly the **hippocampus, brain, limbic system, central nervous system, cerebral cortex, cerebrum, parahippocampal gyrus, telencephalon, temporal lobe, brain stem, prosencephalon, rhombencephalon, occipital lobe, cerebellum, visual cortex, parietal lobe, retina, basal ganglia, neural stem cells, corpus striatum** and **frontal lobe**.
- These genes alone account already for roughly **two thirds of one standard deviation** in cognitive ability.
- These genes are **at least 50% more likely** to exist in one population than in the other, can be **found in at least one third** of either population, and **positively affect Europeans** or negatively affect Africans. **More than 200 genes that meet these requirements** can be **conservatively estimated to exist**.
- The **differences between populations might be even larger** since the African sample included cohorts with European admixture.

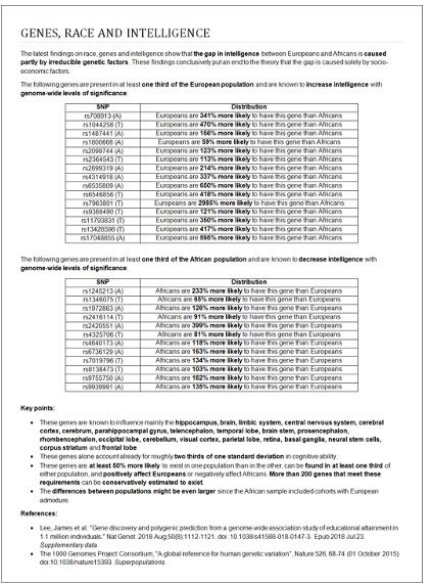
References:

- Lee, James et al. "Gene discovery and polygenic prediction from a genome-wide association study of educational attainment in 1.1 million individuals." Nat Genet. 2018 Aug;50(8):1112-1121. doi: 10.1038/s41588-018-0147-3. Epub 2018 Jul 23. *Supplementary data.*
- The 1000 Genomes Project Consortium, "A global reference for human genetic variation", Nature 526, 68-74 (01 October 2015) doi:10.1038/nature15393. *Superpopulations.*



Slide credit: Jed Carlson

Tracing the origins of the EA3 table



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rs1487441 (A)	Europeans are **166% more likely** to have this gene than Africans
rs1600668 (A)	Europeans are **59% more likely** to have this gene than Africans
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rs11793831 (T)	Europeans are **360% more likely** to have this gene than Africans
rs13426598 (T)	Europeans are **417% more likely** to have this gene than Africans
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rs7019796 (T)	Africans are **134% more likely** to have this gene than Europeans
rs8138473 (T)	Africans are **103% more likely** to have this gene than Europeans
rs9750750 (A)	Africans are **182% more likely** to have this gene than Europeans
rs9939991 (A)	Africans are **136% more likely** to have this gene than Europeans

Key points:

- These genes are known to influence mainly the **hippocampus, brain, limbic system, central nervous system, cerebral cortex, cerebrum, parahippocampal gyrus, telencephalon, temporal lobe, brain stem, prosencephalon, rhombencephalon, occipital lobe, cerebellum, visual cortex, parietal lobe, retina, basal ganglia, neural stem cells, corpus striatum** and **frontal lobe**.
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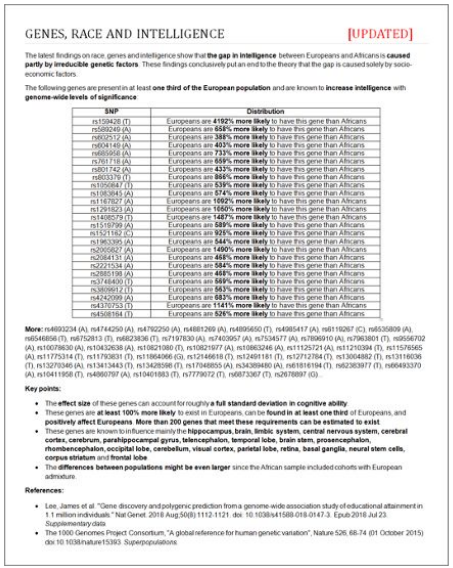
- The 1000 Genomes Project Consortium, "A global reference for human genetic variation", Nature 526, 68-74 (01 October 2015) doi:10.1038/nature15393. Superpopulations.

September 15, 2018



GENES, RACE AND INTELLIGENCE [UPDATED]

The latest findings on race, genes and intelligence show that **the gap in intelligence** between Europeans and Africans is **caused partly by irreducible genetic factors**. These findings conclusively put an end to the theory that the gap is caused solely by socio-economic factors.

The following genes are present in at least **one third of the European population** and are known to **increase intelligence** with **genome-wide levels of significance**:

SNP	Distribution
rs159428 (T)	Europeans are **4192% more likely** to have this gene than Africans
rs589249 (A)	Europeans are **658% more likely** to have this allele than Africans
rs602512 (A)	Europeans are **388% more likely** to have this allele than Africans
rs604149 (A)	Europeans are **403% more likely** to have this allele than Africans
rs6859598 (A)	Europeans are **733% more likely** to have this allele than Africans
rs761718 (A)	Europeans are **669% more likely** to have this allele than Africans
rs801742 (A)	Europeans are **433% more likely** to have this allele than Africans
rs803379 (T)	Europeans are **886% more likely** to have this allele than Africans
rs1050847 (T)	Europeans are **639% more likely** to have this allele than Africans
rs1083845 (A)	Europeans are **574% more likely** to have this allele than Africans
rs1167827 (A)	Europeans are **1092% more likely** to have this allele than Africans
rs1291823 (A)	Europeans are **1050% more likely** to have this allele than Africans
rs1408579 (T)	Europeans are **1487% more likely** to have this allele than Africans
rs1519799 (A)	Europeans are **589% more likely** to have this allele than Africans
rs1521162 (C)	Europeans are **926% more likely** to have this allele than Africans
rs1963395 (A)	Europeans are **544% more likely** to have this allele than Africans
rs2005827 (A)	Europeans are **1490% more likely** to have this allele than Africans
rs2084131 (A)	Europeans are **468% more likely** to have this allele than Africans
rs2291534 (A)	Europeans are **684% more likely** to have this allele than Africans
rs2885198 (A)	Europeans are **468% more likely** to have this allele than Africans
rs3748400 (T)	Europeans are **569% more likely** to have this allele than Africans
rs3809912 (T)	Europeans are **563% more likely** to have this allele than Africans
rs4242099 (A)	Europeans are **683% more likely** to have this allele than Africans
rs4370753 (T)	Europeans are **1141% more likely** to have this allele than Africans
rs4508164 (T)	Europeans are **526% more likely** to have this allele than Africans

More: rs4693234 (A), rs4744250 (A), rs4782250 (A), rs4881269 (A), rs4895650 (T), rs4985417 (A), rs6119267 (C), rs6535809 (A), rs6546856 (T), rs6752813 (T), rs6823836 (T), rs7197830 (A), rs7403957 (A), rs7534577 (A), rs7806910 (A), rs7963801 (T), rs9556702 (A), rs10079830 (A), rs10432638 (A), rs10821080 (T), rs10821977 (A), rs10863246 (A), rs11210394 (T), rs11576565 (A), rs11775314 (T), rs11793831 (T), rs11864066 (G), rs12446619 (T), rs12491181 (T), rs12712784 (T), rs13004882 (T), rs13116036 (T), rs13270346 (A), rs13413443 (T), rs13428598 (T), rs17048855 (A), rs34389480 (A), rs61816194 (T), rs62383977 (T), rs66493370 (A), rs10411958 (T), rs4860797 (A), rs10401883 (T), rs7779072 (T), rs6873067 (T), rs2678897 (G) .

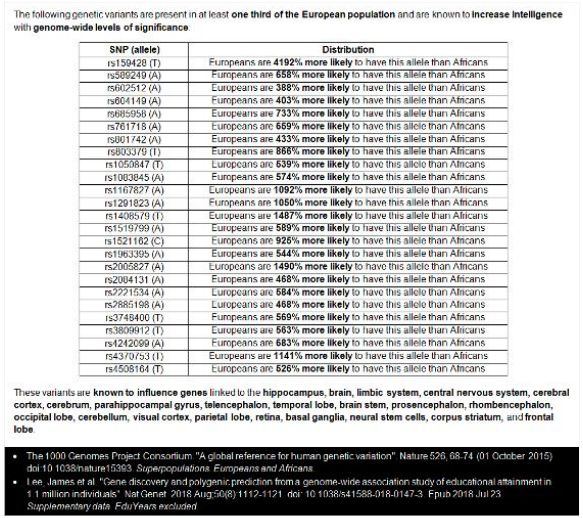
Key points:

- The **effect size** of these genes can account for roughly a **full standard deviation in cognitive ability**.
- These genes are **at least 100% more likely** to exist in Europeans, can be **found in at least one third** of Europeans, and **positively affect Europeans**. **More than 200 genes that meet these requirements can be estimated to exist**.
- These genes are known to influence mainly the **hippocampus, brain, limbic system, central nervous system, cerebral cortex, cerebrum, parahippocampal gyrus, telencephalon, temporal lobe, brain stem, prosencephalon, rhombencephalon, occipital lobe, cerebellum, visual cortex, parietal lobe, retina, basal ganglia, neural stem cells, corpus striatum** and **frontal lobe**.
- The **differences between populations might be even larger** since the African sample included cohorts with European admixture.

References:

- Lee, James et al. "Gene discovery and polygenic prediction from a genome-wide association study of educational attainment in 1.1 million individuals." Nat Genet. 2018 Aug;50(8):1112-1121. doi: 10.1038/s41588-018-0147-3. Epub 2018 Jul 23. Supplementary data
- The 1000 Genomes Project Consortium, "A global reference for human genetic variation", Nature 526, 68-74 (01 October 2015) doi:10.1038/nature15393. Superpopulations.

September 16, 2018



The following genetic variants are present in at least **one third of the European population** and are known to **increase intelligence** with **genome-wide levels of significance**.

SNP (allele)	Distribution
rs159428 (T)	Europeans are **4192% more likely** to have this allele than Africans
rs589249 (A)	Europeans are **658% more likely** to have this allele than Africans
rs602512 (A)	Europeans are **388% more likely** to have this allele than Africans
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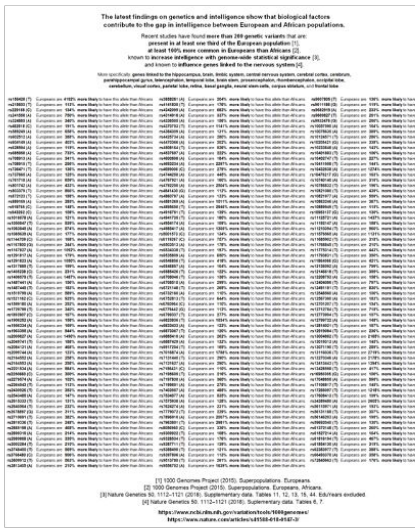
rs4370753 (T)	Europeans are **1141% more likely** to have this allele than Africans
rs4508164 (T)	Europeans are **526% more likely** to have this allele than Africans

These variants are **known to influence genes** linked to the **hippocampus, brain, limbic system, central nervous system, cerebral cortex, cerebrum, parahippocampal gyrus, telencephalon, temporal lobe, brain stem, prosencephalon, rhombencephalon, occipital lobe, cerebellum, visual cortex, parietal lobe, retina, basal ganglia, neural stem cells, corpus striatum,** and **frontal lobe**.

- The 1000 Genomes Project Consortium, "A global reference for human genetic variation". Nature 526, 68-74 (01 October 2015) doi:10.1038/nature15393. *Superpopulations. Europeans and Africans.*
- Lee, James et al. "Gene discovery and polygenic prediction from a genome-wide association study of educational attainment in 1.1 million individuals." Nat Genet. 2018 Aug;50(8):1112-1121. doi: 10.1038/s41588-018-0147-3. Epub 2018 Jul 23. *Supplementary data. EduYears excluded*

September 19, 2018



The latest findings on genetics and intelligence show that biological factors contribute to the gap in intelligence between European and African populations.

Recent studies have found **more than 200 genetic variants** that are:
present in at least one third of the European population [1],
at least 100% more common in Europeans than Africans [2],
known to **increase intelligence with genome-wide statistic of significance** [3],
and known to **influence genes linked to the nervous system**[4].

More specifically: **genes linked to the hippocampus, brain, limbic system, central nervous system, cerebral cortex, cerebrum, parahippocampal gyrus, telencephalon, temporal lobe, brain stem, prosencephalon, rhombencephalon, occipital lobe, cerebellum, visual cortex, parietal lobe, retina, basal ganglia, neural stem cells, corpus striatum,** and **frontal lobe**.

[1] 1000 Genomes Project (2015). Superpopulations. Europeans, Africans.
[2] 1000 Genomes Project (2015). Superpopulations. Europeans, Africans.
[3] Nature Genetics 50, 1112–1121 (2018). Supplementary data. Tables 11, 12, 13, 15, 44. EduYears excluded
[4] Nature Genetics 50, 1112–1121 (2018). Supplementary data. Tables 6, 7

https://www.ncbi.nlm.nih.gov/variation/tools/1000genomes/
https://www.nature.com/articles/s41588-018-0147-3

September 21, 2018

Slide credit: Jed Carlson

How does genetic determinism manifest itself?

Activity: discussion

- Group discussion on 3 traits (educational attainment, athleticism, sexuality)
- Each group will be assigned 1 trait (2 reading materials)

- Educational attainment:
  - The Bell Curve (1994)
  - The Genetic Lottery (2021)
- Athleticism:
  - The Guardian (2000)
  - The Atlantic (2012)
- Sexuality:
  - *A linkage between DNA markers on the X chromosome and male sexual orientation.* Hamer et al. (1993)
  - *Large-scale GWAS reveals insights into the genetic architecture of same-sex sexual behavior.* Ganna et al. (2019)

Activity: discussion

(10 mins) Independent reading

(10 mins) Small groups discussion within traits (3 traits: educational attainment; athleticism; sexuality)

- According to the reading, to what extent are we defined by our genes versus our experiences? Are these arguments supported by science? Do you agree or disagree with the reading material?
- What impact might the arguments presented by reading materials have? Who might they impact?

(10 mins) Large group discussion

- Summarize the arguments presented in your readings
- What are the potential implications these readings might have on society (e.g. harms or benefits)?
- Should research on this trait be done at all?

Trait 1: Educational attainment

The Bell Curve, Richard Herrnstein and Charles Murray (1994)

"This was reflected in the NLSY as well: Holding education constant, similar proportions of blacks, Latinos, and whites are found in the various occupational categories.

To what extent does controlling for IQ produce the same result?...If one ethnic group has a lower average IQ than another ethnic group, this will be reflected in their occupations, other things equal...

Sociologist Linda Gottfredson has examined this question for blacks and whites. If, for example, black and white males were recruited without discrimination into careers as physicians above a cutoff of an IQ of 112 (which she estimates is a fair approximation to the lower bound for the actual population of physicians), the difference in the qualifying population pools would place the black-white ratio at about .05—about one black doctor for every twenty white ones...

We confirm Gottfredson's conclusions with data from the NLSY by going back to the high-IQ occupations we discussed in Chapter 2..."*(p 320-2)*

NLSY: National Longitudinal Survey (conducted by US Bureau of Labor Statistics)

The Genetic Lottery, Paige Harden (2021)

"On the right side of figure 1.1, I have graphed data from a paper in *Nature Genetics*, in which researchers created an *education polygenic index*...The story looks much the same: those whose polygenic indices are in the top quarter of the "genetic" distribution were nearly four times more likely to graduate from college than those in the bottom quarter.

The data on family income on the left, despite being correlational, is considered critically important as a starting point for understanding inequality...The data on family income is also considered by many to be prima facie evidence of unfairness—an inequality that demands to be closed. But what about the data on the right?

In this book, I am going to argue that the data on the right, showing the relationship between measured genes and educational outcomes, is also critically important, both empirically and morally, to understanding social inequality. Like being born to a rich or poor family, being born with a certain set of genetic variants is the outcome of a lottery of birth...And, like social class, the outcome of the genetic lottery is a systemic force that matters for who gets more, and who gets less, of nearly everything we care about in society." *(p 7-10)*

Trait 1: Educational attainment

The Genetic Lottery, Paige Harden (2021)

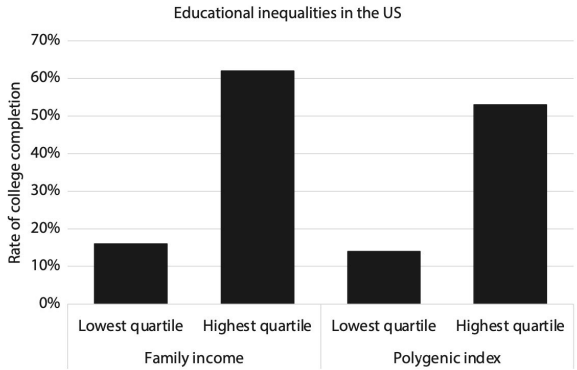


FIGURE 1.1. Inequalities in rates of college completion in the US based on differences in family income versus differences in measured genetics. Data on college completion by income drawn from Margaret W. Cahalan et al., *Indicators of Higher Education Equity in the United States: 2020 Historical Trend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

Trait 2: Athleticism

The Guardian, 2000

Danish sports scientists spent eighteen months in the Kenyan town of Eldoret, the capital of the north-western province where the Kalenjin tribe live. Twelve of the world's top 20 distance runners are Kalenjin and their seemingly effortless victories in 800-metre races and marathons have sparked a passionate debate about genetic advantage.

The scientists compared Kenyan athletes' style and physique with Danish runners. The African athletes' heart rates were remarkably slow, even when running at more than 15mph over long distances.

High altitude - the Kalenjin live on a plateau 7,000ft above sea level - increases the number of red blood cells which carry oxygen around the body and is thought to explain the low heart rate.

Experts, the programme says, went on to observe that the Africans had 'birdlike legs, very long levers which are very, very thin', that enabled them to 'bounce and skip' over the ground, taking off after each footfall far faster than the Europeans.

They 'flowed through the running motion' compared with the Danes, who 'landed heavily and sunk into the ground and almost had to pull themselves forward. They are "pullers", whereas the Kenyans are "bouncers".'

The Atlantic, 2012

Running, like any sport, is inherently physical, and physical traits inform athletic success. Just because Larry Bird and Michael Jordan are tall doesn't mean they aren't first and foremost great athletes. Part of Olympian Michael Phelps' record-breaking swimming is his unusual body shape, which is genetically inborn; you can't train for longer arms. All athletes owe some of their success to their own physical traits, but because Kalenjin runners share those traits across an ethnic group, and because that ethnic group is part of the story of colonialism and white exploitation of blacks for their physical labor, it's harder to talk about. But that doesn't make their athleticism any less amazing.

Trait 3: Sexuality

Hamer et al. (1993)

The role of genetics in male sexual orientation was investigated by pedigree and linkage analyses on 114 families of homosexual men. Increased rates of same-sex orientation were found in the maternal uncles and male cousins of these subjects, but not in their fathers or paternal relatives, suggesting the possibility of sex-linked transmission in a portion of the population. DNA linkage analysis of a selected group of 40 families in which there were two gay brothers and no indication of nonmaternal transmission revealed a correlation between homosexual orientation and the inheritance of polymorphic markers on the X chromosome in approximately 64 percent of the sib-pairs tested. The linkage to markers on Xq28, the subtelomeric region of the long arm of the sex chromosome, had a multipoint lod score of 4.0 ($P = 10^{-5}$), indicating a statistical confidence level of more than 99 percent that at least one subtype of male sexual orientation is genetically influenced.

Ganna et al. (2019)

RESULTS

In the discovery samples (UK Biobank and 23andMe), five autosomal loci were significantly associated with same-sex sexual behavior. Follow-up of these loci suggested links to biological pathways that involve sex hormone regulation and olfaction. Three of the loci were significant in a meta-analysis of smaller, independent replication samples. Although only a few loci passed the stringent statistical corrections for genome-wide multiple testing and were replicated in other samples, our analyses show that many loci underlie same-sex sexual behavior in both sexes. In aggregate, all tested genetic variants accounted for 8 to 25% of variation in male and female same-sex sexual behavior, and the genetic influences were positively but imperfectly correlated between the sexes [genetic correlation coefficient (r_g) = 0.63; 95% confidence intervals, 0.48 to 0.78]. These aggregate genetic influences partly overlapped with those on a variety of other traits, including externalizing behaviors such as smoking, cannabis use, risk-taking, and the personality trait "openness to experience." Additional analyses suggested that sexual behavior, attraction, identity, and fantasies are influenced by a similar set of genetic variants ($r_g > 0.83$); however, the genetic effects that differentiate heterosexual from same-sex sexual behavior are not the same as those that differ among nonheterosexuals with lower versus higher proportions of same-sex partners, which suggests that there is no single continuum from opposite-sex to same-sex preference.

How can researchers combat the harms of genetic determinism?

Activity: Make a FAQ!

- After reading, generate questions you have (or that a potential reader would have)
- Compare to paper's FAQ

Genetic correlates of social stratification in Great Britain

Abdel Abdellaoui, David Hugh-Jones, Loic Yengo, Kathryn E. Kemper, Michel G. Nivard, Laura Veul, Yan Holtz, Brendan P. Zietsch, Timothy M. Frayling, Naomi R. Wray, Jian Yang, Karin J. H. Verweij & Peter M. Visscher

Nature Human Behaviour **3**, 1332–1342 (2019) | Cite this article

Activity: Make a FAQ!

(10 mins) Independent reading

(5 mins) Drafting questions with your partner

(5 mins) Compare to actual FAQ

(5 mins) Discuss in small groups

(5 mins) Large group discussion

Activity: Make a FAQ!

Discussion prompts with a partner

1. Were the questions you asked answered? Were the answers satisfying?
2. How did you perceive the language in the manuscript and in the public-facing FAQ in the supplement? Are there places it could be different/improved?
3. Do you think the FAQ is sufficient to address confusion?
4. Should a study like this be done differently (or not at all)?

Activity: self-reflection and action (15 minutes)

What can we do as researchers to combat the harms of genetic determinism?

Next session: Sex, Gender Identity, Sexuality, and Disability

1. Distinguish the relationship between biological sex, gender identity, and sexuality through discussion of the role genetics plays in these concepts.

2. Examine the medicalization (called a disorder) of identities and how it impacts society, medicine, and research.

3. Critique genetics studies and practices from a disability-rights perspective.

Justin Gomez-Stafford, TA (he/they)

Alvina Adimoelja, TA (she/her)