

2020

23andDiverseMe: Using Genetic Ancestry Tests to Establish Minority Status

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Robert Karl, *23andDiverseMe: Using Genetic Ancestry Tests to Establish Minority Status*, 30 Health Matrix 475 (2020)

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23ANDDIVERSEME: USING GENETIC ANCESTRY TESTS TO ESTABLISH MINORITY STATUS

Robert Kart†

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† J.D. Candidate, 2020, Case Western Reserve University School of Law; M.S. Case Western Reserve University School of Medicine; B.S. The Ohio State University. I dedicate this note to my wife, Beth, because without her love and patience none of this is possible. And to Felix, who inspires me to be a better person every day. Many thanks to Professor Sharona Hoffman for her assistance and feedback throughout the process of writing this note and the members of Health Matrix for all their hard work. Finally, I thank my parents for their constant support and encouragement throughout my life.

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INTRODUCTION

On April 19, 2013, Ralph Taylor applied to the Washington State *Office of Minority and Women’s Business Enterprises* (OMWBE) seeking to have his insurance business certified as a minority business entity.¹ To the public, Mr. Taylor looks like a Caucasian man,² so he is not the demographic the OMWBE typically aims to assist.³ However, on his application, Mr. Taylor marked both “White” and “Black” to identify his race despite “acknowledg[ing] that he grew up thinking of himself as Caucasian.”⁴

It was not until he was in his late forties that Mr. Taylor discovered he had Black ancestry and began to “[embrace] his Black culture.”⁵ How is it that Mr. Taylor, after over four decades

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1. *Orion Ins. Grp. v. Wash. State Office of Minority & Women’s Bus. Enters.*, No. 16-5582 RJB, 2017 WL 3387344, at *2 (W.D. Wash. Aug. 7, 2017).
 2. *See* Declaration of Peter J. Helmberger in Support of State Defendant’s Response to Plaintiffs’ Motion for Summary Judgment and State Defendants’ Crossmotion for Summary Judgment at 58–9, *Orion Ins. Grp. v. Wash. State Office of Minority & Women’s Bus. Enters.*, No. 16-5582 RJB, 2017 WL 3387344 (W.D. Wash. Aug. 7, 2017).
 3. *See About OMWBE*, WASH. ST. OFF. OF MINORITY & WOMEN’S BUS. ENTERPRISES, <https://omwbe.wa.gov/about-omwbe> [<https://perma.cc/PWX5-GSQ6>] (last visited Nov. 1, 2018).
 4. *Orion Ins. Grp.*, 2017 WL 3387344, at *2.
 5. *Id.*

of life, learned of his Black ancestry? He did not learn of this ancestry by speaking with family members, nor through extensive genealogy tracing. Mr. Taylor learned about his Black ancestry from the results of a genetic test, but not one that showed a direct relationship to any particular individual; the results were from a Direct-to-Consumer (DTC) genetic ancestry test.⁶ The results of this test linked him to entire populations of people.⁷

As reported in his results, Mr. Taylor has a genetic makeup estimated at “90% European, 6% Indigenous American, and 4% Sub-Saharan African.”⁸ Accordingly, Mr. Taylor concluded that these results entitled him to apply for minority business enterprise certification, even if he did not look like those whom the agency frequently assisted.⁹ Because of these results, Mr. Taylor asserted that he fell within the definition of a “Black minority” in the controlling regulation.¹⁰

After initially denying his application, the OWMBE voluntarily granted Mr. Taylor the minority business enterprise designation when he appealed the decision.¹¹ To the State of Washington, Ralph Taylor is a Black business owner.

This result raises intriguing questions about how race is and should be handled by federal and state governments, universities, and employers in this post-genomic era. Specifically, can a DTC genetic ancestry test objectively determine a person’s race, or is race a bricolage of biology and lived experiences, meaning that one’s genetic makeup cannot be dispositive? What weight, if any, should the government give these tests in determining minority status, given that these tests are administered by private companies with proprietary databases and algorithms to

6. *Id.*

7. See *Introducing Our New DNA Ethnicity Analysis*, MYHERITAGEDNA (June 1, 2017), <https://blog.myheritage.com/2017/06/introducing-our-new-dna-ethnicity-analysis> [<https://perma.cc/2EX3-L8AF>].

8. *Id.*

9. *Id.*

10. WASH. ADMIN. CODE § 326-02-030 (2018) (defining a Black minority as a person who has their “origins in any of the black racial groups of Africa.”).

11. Orion Ins. Grp., 2017 WL 3387344, at *2.

determine ancestry?¹² Furthermore, does allowing a person to qualify as a minority with only the tiniest percentage of genomic ancestry reinvigorate and reinforce an old racist ideology that anti-discrimination laws aimed to dissolve?¹³

Part I of this Note examines programs that benefit minorities through affirmative action. Part II provides background about DTC genetic ancestry testing, its scientific underpinnings, and its criticisms. Part III explores whether genetic ancestry testing should be accepted as proof of minority status for affirmative action programs by looking at the legislative intent behind these programs and how genetic ancestry tests fit within notions of race in the United States. Lastly, part IV formulates recommendations for regulatory guidelines to address the problem. While genetic ancestry testing is grounded in the legitimate science of population genetics, each company generating results uses different algorithms and weights factors differently, making it as much an art as it is a science. Accordingly, this Note argues that genetic ancestry testing results should be excluded for purposes of proving minority status for affirmative action programs.

I. AFFIRMATIVE ACTION PROGRAMS

Racism and discrimination did not end with the close of the Civil War and ratification of the Thirteenth and Fourteenth

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12. See *Ancestry Composition Guide*, 23ANDME, <https://www.23andme.com/ancestry-composition-guide/> (last visited Dec. 18, 2018) [<https://perma.cc/LZ43-RJYL>] (“Our reference datasets include genotypes from 11,091 people who were carefully chosen to reflect populations that existed before transcontinental travel and migration were common (at least 500 years ago).”); *Evaluating the AncestryDNA Reference Panel*, ANCESTRYDNA, <https://www.ancestry.com/cs/dna-help/ethnicity/reference-panel> [<https://perma.cc/742P-RUZ9>] (last visited Dec. 18, 2018) (including 16,638 individuals in the reference panel, aggregated from public and private data).
 13. F. JAMES DAVIS, WHO IS BLACK? ONE NATION’S DEFINITION 5 (1991). (“The nation’s answer to the question ‘Who is black?’ has long been that a black is any person with any known African black ancestry In the South it became known as the ‘one-drop rule,’ meaning that a single drop of ‘black blood’ makes a person a black. It is also known as the ‘one black ancestor rule,’ some courts have called it the ‘traceable amount rule,’ and anthropologists call it the ‘hypo-descent rule,’ meaning that racially mixed persons are assigned the status of the subordinate group.”).

Amendments. Indeed, shortly after the war, the Supreme Court held in the “Civil Rights Cases”¹⁴ that the federal government could not protect newly freed slaves or any other person from discrimination by private individuals under the Fourteenth Amendment.¹⁵ It was not until 100 years after the Civil War that Congress passed The Civil Rights Act of 1964 and finally extended such protections.¹⁶ The holding in the early Civil Rights Cases combined with other factors stemming from generations of slavery caused profoundly negative impacts in educational attainment, employment, housing, and wealth still felt today.¹⁷

In its more recent history, the Supreme Court has repeatedly held that laws which discriminate based on race, even if facially

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14. Civil Rights Cases, 109 U.S. 3 (1883).
 15. United States v. Stanley, 109 U.S. 3, 11 (1883) (“It is State action of a particular character that is prohibited. Individual invasion of individual rights is not the subject-matter of the amendment It does not authorize Congress to create a code of municipal law for the regulation of private rights.”).
 16. Civil Rights Act of 1964, Pub. L. No. 88-352, 78 Stat. 241 (1964); *see also* Heart of Atlanta Motel v. U.S., 379 U.S. 241, 261 (1964) (holding that Congress was within its power to prohibit racial discrimination by motels serving travelers under the commerce clause).
 17. For example, the Federal Reserve released the results of the 2016 Survey of Consumer Finances showing that White families have a median family wealth of \$171,000 while Black families have a median family wealth of only \$17,600. Lisa Dettling et al., *Recent Trends in Wealth-Holding by Race and Ethnicity: Evidence from the Survey of Consumer Finances*, FEDS NOTES: BD. OF GOVS. OF FED. RES. SYS. (Sept. 27, 2017), <https://doi.org/10.17016/2380-7172.2083> [<https://perma.cc/YH6T-R25B>]; *See, e.g.*, Melany De La Cruz-Viesca, et al., *Fifty Years After the Kerner Commission Report: Place, Housing, and Racial Wealth Inequality in Los Angeles*, 4 RSF: THE RUSSELL SAGE FOUND. J. OF THE SOC. SCI. 160, 173 (2018); Robert L. Reece & Heather A. O’Connell, *How the Legacy of Slavery and Racial Composition Shape Public School Enrollment in the American South*, 2 SOC. RACE AND ETHNICITY 42, 42 (2016); Christian E. Weller & Jaryn Fields, *The Black and White Labor Gap in America*, CTR. FOR AM. PROGRESS (July 25, 2011), <https://www.americanprogress.org/issues/economy/reports/2011/07/25/9992/the-black-and-white-labor-gap-in-america> [<https://perma.cc/5YLT-2HYX>].

neutral, are unconstitutional.¹⁸ However, laws that take race into account, not for discriminatory purposes, but to advantage a racial minority, are not *per se* unconstitutional.¹⁹ In *Fullilove v. Klutznick*, the Court stated, “[w]e reject the contention that in the remedial context the Congress must act in a wholly ‘color-blind’ fashion.”²⁰ These laws must pass strict scrutiny to be considered constitutional; that is, the law must be strictly tailored to cure past discrimination, and there must be no other method the State can employ to achieve that purpose.²¹ The federal government first instituted affirmative action programs for the remedial purpose of addressing race and sex discrimination in 1965.²² Remedial affirmative action programs are especially popular in the area of government contracting.²³

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18. See *Loving v. Virginia*, 388 U.S. 1817, 1823 (1967); *Brown v. Bd. of Educ.*, 347 U.S. 483 (1954); *Yick Wo v. Hopkins*, 118 U.S. 356 (1886).
 19. *Shaw v. Hunt*, 517 U.S. 899, 909 (1996) (“A State’s interest in remedying the effects of past or present racial discrimination may in the proper case justify a government’s use of racial distinctions.”); *Adarand Constructors, Inc. v. Peña*, 115 S.Ct. 2097, 2098 (1995) (“[A]ll racial classifications, imposed by whatever federal, state, or local governmental actor, must be analyzed by a reviewing court under strict scrutiny”).
 20. *Fullilove v. Klutznick*, 448 U.S. 448, 482 (1980).
 21. *Adarand*, 115 S.Ct. at 2098 (“such classifications are constitutional only if they are narrowly tailored measures that further compelling governmental interests.”). The discrimination must be “identified discrimination.” *Id.* While the States and their subdivisions may take remedial action when they possess evidence of past or present discrimination, “they must identify that discrimination, public or private, with some specificity before they may use race-conscious relief.” *Id.* A generalized assertion of past discrimination in a particular industry or region is not adequate because it “provides no guidance for a legislative body to determine the precise scope of the injury it seeks to remedy.” *Shaw*, 517 U.S. at 909.
 22. Exec. Order No. 11,246, 30 Fed. Reg. 12,319 (Sept. 24, 1965); Exec. Order No. 11,375, 32 Fed. Reg. 14,303 (Oct. 13, 1967).
 23. Small Business Act of 1978, Pub. L. No. 95-507, §637 92 Stat. 1757 (1978); See Public Works Employment Act of 1977, Pub. L. No. 95-28, 91 Stat. 116 (1977).

A. *Remediation of Past Discrimination*

One way federal and state governments have sought to help remedy the historical and systemic injustices of slavery and discrimination is by making it easier for minorities to win government contracts and subcontracts. Two such programs that make racial distinctions for remediation are the 8(a) program of the Small Business Act²⁴ and the Disadvantaged Business Enterprise (DBE) program under the Department of Transportation.²⁵

1. Small Business Administration Section 8(a) Program

The first real steps toward affirmative action began during World War II when President Franklin Roosevelt created the Fair Employment Practice Committee, in response to a call by African American leaders to help abolish discrimination in defense contracting.²⁶ This first attempt at affirmative action was mostly unsuccessful, and inequality remained prevalent in the United States, ultimately culminating in the unrest and race riots of the 1960s.²⁷

In reaction to the unrest, President Johnson commissioned the Kerner reports,²⁸ and Congress subsequently commissioned studies to examine impediments to the success of minority

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24. So named for the section of the bill proscribing the program. Small Business Act of 1978, Pub. L. No. 95-507, §637 92 Stat. 1757 (1978).
25. *See* Public Works Employment Act of 1977, Pub. L. No. 95-28, 91 Stat. 116 (1977); Surface Transportation Assistance Act, Pub. L. No. 97-424, §140 96 Stat. 2097 (1983); Moving Ahead for Progress in the 21st Century Act, Pub. L. No. 112-141, § 1101(b), 126 Stat. 405, 414–16 (2012); Fixing America’s Surface Transportation Act, Pub. L. No. 114-94, § 1101, 129 Stat. 1312 (2015).
26. Exec. Order No. 8,802, 6 Fed. Reg. 3,109 (June 25, 1941).
27. *See* Daniel J. Myers, *Racial Rioting in the 1960S: An Event History Analysis of Local Conditions*, 62 AM. SOC. REV. 94, 96 (1997).
28. NAT’L ADVISORY COMM’N ON CIV. DISORDERS, REP. OF THE NAT’L ADVISORY COMM’N ON CIV. DISORDERS: SUMMARY OF REP. The basic conclusion of the commission was that, “Our Nation is moving toward two societies, one black, one white-separate and unequal” and recommended steps be taken to increase level of minority business ownership. *Id.*

businesses.²⁹ Congressional studies found that while minorities made up approximately seventeen percent of the population, they owned slightly more than four percent of small businesses, and their share of government contracts was vanishingly small.³⁰ In fact, minority-owned businesses only received seven-tenths of one percent of the contracting dollars at the state and local level.³¹ This disparity led Congress, in 1978, to legislatively restrict the 8(a) program (which was initially drafted to aid all small business) to benefit only the socially disadvantaged businesses of minority business owners.³² Under the 8(a) program, the Small Business Administration³³ (SBA) enters into procurement contracts with the United States Government and its agencies.³⁴ The SBA then subcontracts these procurement contracts to socially and economically disadvantaged business owners.³⁵

It is not hard to imagine why an individual would want to qualify for the 8(a) program. In fiscal year 2014, the SBA awarded \$17 billion in 8(a) contracts.³⁶ After a business is 8(a) certified, it “can take advantage of specialized business training, counseling, marketing assistance and high-level executive development provided by the SBA and [its] resource partners. [It] may also be

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29. *See* S. REP. NO. 95-1070 at 16–17 (1978); *see generally* H.R. REP. NO. 94-1791 (1977); *see generally* H.R. REP. NO. 94-468 (1975); H.R. REP. NO. 92-1615 (1972).
 30. *DynaLantic Corp. v. United States DOD*, 885 F. Supp. 2d 237, 253 (D.D.C. 2012).
 31. U.S. COMM’N ON CIVIL RIGHTS, MINORITIES AND WOMEN AS GOVERNMENT CONTRACTORS 122 (1975).
 32. Before this the 8(a) program focused on all small business, not just those that were socially disadvantaged. Small Business Act of 1978, Pub. L. No. 95-507, §636 92 Stat. 1757 (1978).
 33. “The SBA was created in 1953 as an independent agency of the federal government to aid, counsel, assist and protect the interests of small business concerns, to preserve free competitive enterprise and to maintain and strengthen the overall economy of our nation.” *Organization*, U.S. SMALL BUS. ADMIN., <https://www.sba.gov/about-sba/organization> [<https://perma.cc/DH5N-3HG2>] (last visited Mar. 8, 2019).
 34. Small Business Act and the Small Business Investment Act, Pub. L. No. 95-507, § 202, 92 Stat. 1757, 1761 (1978).
 35. *Id.*
 36. U.S. SMALL BUS. ADMIN., OFFICE OF BUS. DEV., FY 2014 408 REPORT TO CONGRESS 16 (2014).

eligible for assistance in obtaining access to surplus government property and supplies³⁷, SBA-guaranteed loans, and bonding assistance.³⁸ Additionally, certification allows a business to receive up to \$6.5 million in sole-source manufacturing contracts and \$4 million in goods and services sole-source contracts.³⁹ Typically, small businesses submit competitive bids to the government and often the business that submits the lowest bid wins the contract.⁴⁰ These sole-source contracts are contracts that are awarded without the normal competitive bidding process so the business does not need to be the lowest bidder.⁴¹

2. Disadvantaged Business Enterprise Program

The United States Congress first passed the DBE program in the early 1980s as part of the Surface Transportation Assistance Act and has continually reauthorized the program through the present time.⁴² This program “sets a goal of not less than ten percent of federal funds authorized to be spent on highway and transit programs be expended through small business concerns that are owned and controlled by socially and economically

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37. Businesses participating in the 8(a) program are able to obtain federal government surplus property and only need to pay “direct costs of locating, inspecting, and transporting the surplus property.” 13 C.F.R. § 124.405(e) (2018).
38. *What is the 8(a) Business Development Program?*, MINORITY DEV. BUS. AGENCY, <https://www.mdba.gov/news/blog/2012/03/what-8a-business-development-program> [https://perma.cc/U8EW-W43M] (last visited Aug. 26, 2019).
39. *Id.*
40. *Competitive Bidding: What is Competitive Bidding?*, FINDRFP, <https://www.findrfp.com/Government-Contracting/competitive-bidding.aspx##targetText=Competitive%20bidding%20is%20a%20process,compete%20for%20a%20specific%20project.&targetText=By%20making%20it%20a%20competitive,companies%20to%20do%20the%20work> [https://perma.cc/MBV2-ZTXB] (last visited Sept. 21, 2019).
41. *Non-Competitive / Sole Source Procurement: Seven Questions*, NAT’L ASS. OF ST. PROCUREMENT OFFICIALS (Jan. 2015), https://www.naspo.org/SoleSourceProcurement/7-Question_Sole_Source_Procurement_briefing_paper-1-13-15.pdf [https://perma.cc/YZ96-SNHP].
42. Surface Transportation Assistance Act, Pub. L. No. 97-424, § 637 96 Stat. 2097 (1983); Fixing America’s Surface Transportation Act, Pub. L. No. 114-94, § 1101, 129 Stat. 1312 (2015).

disadvantaged individuals.”⁴³ The program requires individual states to establish a DBE program appropriate to the area in order to receive federally subsidized funds.⁴⁴ Any business owner may demonstrate that they are socially and economically disadvantaged, even if they are not a minority.⁴⁵ Businesses owned by white males have qualified for DBE status but do not receive the benefit of a presumption of social and economic disadvantage and must be analyzed on a case-by-case basis.⁴⁶

Attaining certification as a DBE allows a company to more easily win lucrative transportation contracts because, like the 8(a) program, these companies are only competing against other DBEs rather than all contractors.⁴⁷ Additionally, prime contractors are more likely to give sub-contracts to businesses with the DBE designation because doing so allows the prime contractor to more efficiently meet the stated Congressional goals of the DBE

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43. *Orion Ins. Grp. v. Wash. State Office of Minority & Women’s Bus. Enters.*, No. 16-5582 RJB, 2017 WL 3387344, at *1 (W.D. Wash. Aug. 7, 2017) (internal quotation marks omitted).
44. *See* 49 C.F.R. § 23 (2018); “(a) If you are in one of these categories and let DOT-assisted contracts, you must have a DBE program meeting the requirements of this part:
- (1) All FHWA primary recipients receiving funds authorized by a statute to which this part applies;
 - (2) FTA recipients receiving planning, capital and/or operating assistance who will award prime contracts (excluding transit vehicle purchases) the cumulative total value of which exceeds \$250,000 in FTA funds in a Federal fiscal year;
 - (3) FAA recipients receiving grants for airport planning or development who will award prime contracts the cumulative total value of which exceeds \$250,000 in FAA funds in a Federal fiscal year.” 49 C.F.R. § 26.21 (2018).
45. *See* 49 C.F.R. § 26 (1999).
46. *Id.*; “(d) *Individual determinations of social and economic disadvantage.* Firms owned and controlled by individuals who are not presumed to be socially and economically disadvantaged (including individuals whose presumed disadvantage has been rebutted) may apply for DBE certification. You must make a case-by-case determination of whether each individual whose ownership and control are relied upon for DBE certification is socially and economically disadvantaged.” 49 C.F.R. § 26.67 (2018).
47. *Disadvantaged Business FAQs*, CONNECTNCDOT, <https://connect.ncdot.gov/business/SmallBusiness/Lists/FAQs2/DispForm.aspx?ID=4> [<https://perma.cc/S545-77AZ>] (last visited Jan. 10, 2018).

program.⁴⁸ Because of this, the programs have been repeatedly attacked in the courts as unconstitutional, but have withstood scrutiny when the DBE program is administered correctly by a state.⁴⁹

B. *Viewpoint Diversity*

While earlier affirmative action policies were based on remediation of past wrongs and identified discrimination, later programs focused on diversity of viewpoint.

The first context in which the Supreme Court has upheld the use of race in fostering viewpoint diversity is higher education.⁵⁰ In *Regents of Univ. of Cal. v. Bakke*, Justice Powell stated that while universities could not make admissions decisions based solely on race, using race as a *factor* in selecting students for admission was permissible.⁵¹ Since this first case, the Supreme Court has repeatedly upheld as constitutional affirmative action programs in university admissions that use race as a factor.⁵² The purpose of these programs is to achieve a “critical mass” of minority students.⁵³

Discrimination in private employment is prohibited under Title VII of the Civil Rights Act, which disallows using race to discriminate in hiring for private employers.⁵⁴ Private companies have, however, used race to voluntarily institute affirmative

48. *Id.*

49. *See e.g.* *Midwest Fence Corp. v. U.S. Dep’t of Transp.*, 840 F.3d 932 (7th Cir. 2016); *Associated Gen. Contractors of Am., San Diego Chapter, Inc. v. Cal. Dep’t. of Transp.*, 713 F.3d 1187, 1200 (9th Cir. 2013); *Milwaukee Cty. Pavers Assn. v. Fielder*, 710 F. Supp. 1532 (W.D. Wis. 1989).

50. *See Regents of the Univ. of California v. Bakke*, 438 U.S. 265, 267 (1978) (plurality opinion).

51. *Id.* at 314–15.

52. *See, e.g.*, *Fisher v. Univ. of Tex. (Fischer II)*, 136 S.Ct. 2198, 2214–15 (2016); *Fisher v. Univ. of Tex. (Fischer I)*, 133 S.Ct. 2411, 2421–22 (2013); *Grutter v. Bollinger*, 539 U.S. 306, 345 (2003); *C.f. Gratz v. Bollinger*, 539 U.S. 244, 246 (2003) (holding that a rigid “quota system” violates the equal protection clause of the Fourteenth Amendment).

53. *See, Grutter*, 539 U.S. at 306.

54. Civil Rights Act of 1964, Pub. L. No. 88-352, § 703, 78 Stat. 241, 255 (1964).

action programs.⁵⁵ While Title VII prohibits discrimination in hiring based on race, the Supreme Court has allowed an exception where race is a factor in designing an affirmative action plan.⁵⁶ The purpose of these plans is to encourage the hiring of minorities to remedy past and continuing discrimination.⁵⁷

C. Qualifying as a Minority

To participate in the 8(a) and DBE programs, a business must be, in part, "at least 51 percent owned [as well as managed and controlled] by one or more individuals who are both socially and economically disadvantaged."⁵⁸ Currently, regulations define socially disadvantaged individuals as "those who have been subjected to racial or ethnic prejudice or cultural bias within American society because of their identities as members of groups and without regard to their individual qualities."⁵⁹ For purposes of administering the 8(a) and DBE programs, individuals self-identify their race when applying for certification, and those who identify among the classes of people listed receive a rebuttable presumption of being socially disadvantaged.⁶⁰ If the state agency administering the federal DBE program or the SBA has a well-founded reason to doubt a person's group membership, it can request more evidence as proof.⁶¹ Some state statutes proscribing similar programs, like Washington's Minority Business Enterprise program,⁶² lack a rebuttable presumption, that can lead to persons who do not outwardly appear to be actual minorities, like

55. See *Johnson v. Transp. Agency*, 480 U.S. 616 (1987); *United Steelworkers of Am. v. Weber*, 443 U.S. 193, 198 (1979).

56. *Johnson*, 480 U.S. at 629.

57. *Id.*

58. 49 C.F.R. § 26.5 (2018).

59. 49 C.F.R. § 26 APPENDIX E (2018).

60. A rebuttable presumption is an assumption taken as true unless someone presents evidence to prove otherwise. THE LAW DICTIONARY, <https://thelawdictionary.org/rebuttable-presumption/> [<https://perma.cc/WU6A-KU9Z>] (last visited Sept. 8, 2019).

61. "You must rebuttably presume that members of the designated groups identified in §26.67(a) are socially and economically disadvantaged." 49 C.F.R. § 26.61 (2018).

62. See, e.g., WASH. ADMIN. CODE § 326-02-010 (2018).

Mr. Taylor, claiming membership in a minority group to take advantage of the programs.⁶³

The groups explicitly enumerated as being socially disadvantaged are Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Subcontinent Asian Americans, and women.⁶⁴ Among these groups, there are three ways that the government qualifies minority status. Qualifying as a Native American is strict and is dependent on attaining tribal membership; it is outside the control or discretion of the federal government.⁶⁵ Qualifying as Hispanic requires a person to have their culture or origin associated with certain listed countries, but does *not* depend solely on race.⁶⁶ Finally, the remaining groups, excluding women, require a person to have their origins in the specific groups of people.⁶⁷ Curiously, to qualify as a “Black American” for the DBE program, one simply needs to “[have] origins in any of the Black racial groups of Africa.”⁶⁸

At first blush, it seems as though to qualify as a Black American, even minimal ancestry should suffice. The question then becomes, does an objective measure exist to determine whether one has ancestry in, for example, these Black racial groups? One method that may prove to be objective is the use of a genetic ancestry tests like those sold from the DTC genetic-testing companies 23&Me and Ancestry.⁶⁹ With lucrative

63. Christine Willmsen, *Lynnwood Man Tried to Use a Home DNA Test to Qualify as a Minority Business Owner. He Was Denied—Now He’s Suing.*, SEATTLE TIMES (Sept. 17, 2018, 10:13 AM), <https://www.seattletimes.com/seattle-news/lynnwood-man-tried-to-use-a-home-dna-test-to-qualify-as-a-minority-business-owner-he-was-denied-now-hes-suing/> [https://perma.cc/KP7E-UTRA].

64. 49 C.F.R. § 26.5 (2018).

65. “‘Native Americans,’ which includes persons who are enrolled members of a federally or State recognized Indian tribe.” *Id.*

66. “‘Hispanic Americans,’ which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race.” *Id.*

67. *Id.*

68. “‘Black Americans,’ which includes persons having origins in any of the Black racial groups of Africa.” *Id.*

69. 23ANDME, <https://www.23andme.com/dna-ancestry/> [https://perma.cc/3RTF-PG9X] (last visited Nov. 1, 2018); *What to Expect from AncestryDNA*, ANCESTRYSUPPORT, <https://support.ancestry>

government contracts, employment opportunities, and access to elite institutions of higher education riding on one's genetic makeup, people may increasingly try to use these ancestry tests to claim minority status.

II. DIRECT-TO-CONSUMER GENETIC TESTING

Since the completion of the sequencing of the first human genome and the improved techniques and technologies that it ushered in, costs for DNA sequencing have fallen dramatically.⁷⁰ These improvements allowed private companies to bring a version of genetic testing directly to consumers at significantly reduced costs.⁷¹ Since their introduction, over 12 million consumers have taken DTC genetic tests.⁷² Research suggests that “around 1 in 25 American adults now have access to personal genetic data.”⁷³ Currently, there are over 200 companies that offer DTC genetic

.com/s/article/What-to-Expect-from-AncestryDNA [https://perma.cc/D643-5TS9] (last visited Sept. 12, 2019).

70. The first sequenced human genome took approximately 13 years and \$1 billion to complete, but by 2015 a similar human genome cost only \$1,500 to produce. *The Cost of Sequencing a Human Genome*, NAT'L HUM. GENOME RES. INST. (Oct. 30, 2019), <https://www.genome.gov/27565109/the-cost-of-sequencing-a-human-genome/> [https://perma.cc/3D4E-FKVU].
71. What is normally thought of as direct-to-consumer DNA testing was first launched in 2007 by 23andMe and Navigenics. Stuart Hogarth & Paula Saukko, *A Market in the Making: The Past, Present and Future of Direct-to-Consumer Genomics*, 36 NEW GENETICS AND SOC'Y 197 (2017); Andrew Pollack, *DNA Profile Provider Is Cutting Its Prices*, N.Y. TIMES (Sept. 9, 2008), <https://www.nytimes.com/2008/09/09/business/09gene.html> [https://perma.cc/TQJ5-LJT5]; Lydia Ramsey, *23andMe Is Now Offering a \$99 Genetics Test Again—But It's Very Different from the Original*, BUS. INSIDER (Sept. 22, 2016, 4:53 PM), <https://www.businessinsider.com/23andme-99-ancestry-test-2016-9> [https://perma.cc/E92Y-TW6P].
72. Antonio Regalado, *2017 Was the Year Consumer DNA Testing Blew Up*, MIT TECH. REV. (Feb. 12, 2018), <https://www.technologyreview.com/s/610233/2017-was-the-year-consumer-dna-testing-blew-up> [https://perma.cc/67UD-9QVY].
73. *Id.*

tests, and the market for these tests is expected to approach \$250 million by 2020.⁷⁴

The variety of tests offered runs the gamut. Results can provide information of paramount importance, such as informing a person that they harbor a genetic mutation that predisposes them to develop cancer,⁷⁵ or helping police solve decades-old crimes using the databases created by the DTC genetic-testing companies.⁷⁶ The results can also relay entertaining but trivial information, like whether the user has the “warrior” gene⁷⁷ or if they are likely to have an aversion to the taste of cilantro.⁷⁸

There are three main types of tests offered by DTC testing companies: disease and health risk, direct family relationships, and ancestry or genealogy.⁷⁹ Disease and health risk results inform the user if they have any variation in their DNA that is linked to

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74. Andelka M. Phillips, *Only a Click Away — DTC Genetics for Ancestry, Health, Love . . . and More: A View of the Business and Regulatory Landscape*, 8 APPLIED & TRANSLATIONAL GENOMICS 16, 17 (2016); *Size of the Global Direct-to-Consumer (DTC) Genetic Testing Market from 2014 to 2022 (in million U.S. dollars)*, STATISTA, <https://www.statista.com/statistics/792022/global-direct-to-consumer-genetic-testing-market-size> [<https://perma.cc/VE8S-FNFW>] (last updated Feb. 10, 2018).
75. Sarah Zhang, *23andMe Will Now Test for BRCA Breast-Cancer Genes*, THE ATLANTIC (Mar. 6, 2018), <https://www.theatlantic.com/health/archive/2018/03/23andme-brca-breast-cancer/554957> [<https://perma.cc/NWS5-SW7A>].
76. Michael Balsamo, *A Look at DNA Testing That ID'd a Suspected Serial Killer*, WASH. POST (Apr. 27, 2018), https://www.washingtonpost.com/national/health-science/a-look-at-dna-testing-that-idd-a-suspected-serial-killer/2018/04/27/f661b42e-49e6-11e8-8082-105a446d19b8_story.html [<https://perma.cc/QWL9-C3GS>].
77. *Are You a Warrior?*, FAMILYTREEDNA, <https://www.familytree dna.com/landing/warrior-gene.aspx>, [<https://perma.cc/NVK8-AP89>] (last visited Nov 1, 2018).
78. *23andMe Adds Four New Trait Reports*, 23ANDME (June 21, 2018), <https://blog.23andme.com/health-traits/23andme-adds-four-new-trait-reports/> [<https://perma.cc/F6EQ-AN5E>].
79. *What Kinds of Direct-to-Consumer Genetic Tests are Available?*, U.S. NAT'L LIBRARY OF MED. (Sept. 10, 2019), <https://ghr.nlm.nih.gov/primer/dtcgeneticstesting/dtctesttypes> [<https://perma.cc/4A9W-B4WE>].

a disease or an increased risk of developing a disease.⁸⁰ Testing for direct family relationships can tell a user if someone is a close relative like a parent, sibling, or cousin and these results are typically very accurate.⁸¹ The most popular type of test is ancestry or genealogy testing, and there are currently over 70 companies offering such tests.⁸² The two largest companies in this realm spent a combined total of \$130 million on marketing in 2016.⁸³ This advertising push is likely to lead to even more people discovering small amounts of minority ancestry and possibly seeking the assistance of affirmative action programs.

A. Genetic Inheritance

The human genome consists of approximately 20,000 genes coded into DNA by four nucleic acid base pairs.⁸⁴ Humans have three billion base pairs condensed into twenty-three pairs of chromosomes, twenty-two autosomes and one pair of sex chromosomes.⁸⁵ Every cell in the human body, with few

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80. *What Health-Related Information Can I Learn From 23andMe?*, 23ANDME, <https://customercare.23andme.com/hc/en-us/articles/115013843028-What-health-related-information-can-I-learn-from-23andMe-#health> [<https://perma.cc/3GQW-BG6W>] (last visited Mar. 16, 2019).
81. *See, e.g.*, Jeff Gammage, *DNA Helping Chinese Adoptees Do What Was Once Impossible: Locate Blood Relatives in This Country*, PHILA. INQUIRER (Mar. 15, 2019), <https://www.philly.com/news/china-adoption-adoptee-dna-temple-university-20190315.html> [<https://perma.cc/9GNK-YEWA>]; Adam Rutherford, *How Accurate Are Online DNA Tests?*, SCI. AM. (Oct. 15, 2018), <https://www.scientificamerican.com/article/how-accurate-are-online-dna-tests/> [<https://perma.cc/MY9P-RLKL>].
82. Phillips, *supra* note 74, at 18.
83. Regalado, *supra* note 72.
84. The nucleic acids that make up DNA are adenine, guanine, cytosine, and thymine. Iakes Ezkurdia, et al., *Multiple Evidence Strands Suggest that There May Be as Few as 19,000 Human Protein-coding Genes*, 23 HUM. MOLECULAR GENETICS 5866, 5866 (2014).
85. Autosomal chromosomes are the same in both males and females, while females have two X chromosomes and males an X and a Y chromosome. *How Many Chromosomes Do People Have?*, U.S. NAT'L LIBRARY OF MED., <https://ghr.nlm.nih.gov/primer/basics/howmanychromosomes> [<https://perma.cc/G9JG-SCTJ>] (last visited Oct. 31, 2018); *The Human Genome Project Completion: Frequently Asked Questions*, NAT'L HUM. GENOME RES. INST.,

exceptions, has the same DNA arranged in these chromosomes.⁸⁶ The two notable exceptions, sperm and eggs, have half the amount of chromosomes as a normal somatic cell.⁸⁷ These are called gametes, and during sexual reproduction the sperm and egg come together to provide a full complement of chromosomes.⁸⁸ So, each person inherits half their DNA from each parent, and this passing of material from generation to generation is called genetic inheritance.⁸⁹

A specialized type of cell division called meiosis generates gametes.⁹⁰ In this process—as the gamete forms—the number of chromosomes is halved.⁹¹ During this halving, each parent’s matching pairs of chromosomes undergo recombination events.⁹² These recombination events involve sections of the opposing chromosomes swapping segments.⁹³ This results in an

<https://www.genome.gov/11006943/human-genome-project-completion-frequently-asked-questions/> [<https://perma.cc/WB5F-MC2U>] (last visited Mar. 14, 2019).

86. *Chromosomes*, NAT’L HUM. GENOME RES. INST., <https://www.genome.gov/26524120/> [<https://perma.cc/4R6W-DBDE>] (last visited Nov. 2, 2018).
87. A Somatic cell is any cell of an organism other than the gametes. *Somatic Cells*, NAT’L HUM. GENOME RES. INST., <https://www.genome.gov/genetics-glossary/Somatic-Cells> [<https://perma.cc/SVY8-RZNY>] (last visited Feb. 18, 2020); *Meiosis and Formation of Eggs and Sperm*, IUPUI DEP’T OF BIOLOGY (Feb. 16, 2000), <https://www.biology.iupui.edu/biocourses/N100H/ch9meiosis.html> [<https://perma.cc/2NJA-5LYZ>].
88. See *Fertilisation*, GENOMICS EDUC. PROGRAMME, <https://www.genomicseducation.hee.nhs.uk/glossary/fertilisation/> [<https://perma.cc/44XF-7CY3>] (last visited Aug. 25, 2019).
89. *What is Inheritance?*, YOURGENOME, <https://www.yourgenome.org/facts/what-is-inheritance> [<https://perma.cc/5UCP-SPRR>] (last visited Nov. 2, 2018).
90. William Shiel Jr., *Medical Definition of Gametogenesis*, MEDICINENET, <https://www.medicinenet.com/script/main/art.asp?articlekey=12352> [<https://perma.cc/FYJ8-LP4A>] (last visited Feb. 18, 2020).
91. Adèle L. Marston & Angelika Amon, *Meiosis: Cell-cycle Controls Shuffle and Deal*, 5 NATURE REVS. MOLECULAR CELL BIOLOGY 983, 994 (2004) (providing a detailed review of meiosis).
92. *Id.* at 984.
93. *Id.* at 984–985.

arrangement of the child's chromosomes which is a unique combination derived from the parents.⁹⁴ This recombination increases overall genetic diversity through repeated rounds of sexual reproduction.⁹⁵ Unlike the other chromosomes, the Y-chromosome in males does not undergo recombination making it particularly useful when studying ancestry.⁹⁶

In addition to recombination events during gametogenesis, mutations increase genetic diversity through random changes passed to the next generation.⁹⁷ DNA replication machinery⁹⁸ is not perfect, and because of this, mutations are introduced into the DNA of cells.⁹⁹ However, to be passed on to subsequent generations, these mutations must occur in the gametes and research has shown that the mutation rate in other cells is much higher than in gametes.¹⁰⁰ Notwithstanding, new mutations can

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94. For example, the maternal chromosome 3 pairs with the paternal chromosome 3, but before segregation they swap small segments of DNA during recombination. As a result, the child's chromosome 3 has bits from each parent making it a unique arrangement compared to either parent. *Id.* at 986.
95. See Laia Capilla et al., *Mammalian Meiotic Recombination: A Toolbox for Genome Evolution*, 150 CYTOGENETIC AND GENOME RES. 1, 10 (2017).
96. See Doris Bachtrog, *Y-chromosome Evolution: Emerging Insights into Processes of Y-chromosome Degeneration*, 14 NATURE REVIEWS GENETICS 113, 113 (2013).
97. *What Is Genetic Variation?*, EUR. BIOINFORMATICS INST., <https://www.ebi.ac.uk/training/online/course/human-genetic-variation-i-introduction/what-genetic-variation> [<https://perma.cc/5TGP-ZHRS>] (last visited Oct. 26, 2018).
98. DNA Replication machinery is a molecular-biology term that describes the large number of proteins and other factors that all work together like a machine to replicate the DNA during cell division. HARVEY LODISH ET AL., *MOLECULAR CELL BIOLOGY* § 12.2 (W.H. Freeman ed., 4th ed. 2000).
99. Leslie A. Pray, *DNA Replication and Causes of Mutation*, NATURE EDUC., <https://www.nature.com/scitable/topicpage/dna-replication-and-causes-of-mutation-409> [<https://perma.cc/CT29-9345>] (last visited Oct. 26, 2018).
100. Brandon Milholland, et al., *Differences Between Germline and Somatic Mutation Rates in Humans and Mice*, 8 NATURE COMM. 4 (2017).

account for between 50 and 200 changes between parent and child.¹⁰¹

All this recombination and mutation leads to every individual having a unique genotype.¹⁰² A genotype is a person's collection of genes and regions that control the expression of genes, and it is these genes that determine the phenotype, or outward expression, of a person's traits.¹⁰³ Thus, it is generally a person's phenotype, not genotype, that society associates with race.¹⁰⁴

B. Ancestry Testing

The completion of the Human Genome Project confirmed that humans, at a genetic level, share 99.9% of their 3 billion base pairs of DNA.¹⁰⁵ However, this means that the average person still has 4.1 to 5 million differences in their DNA compared to the reference genome.¹⁰⁶ Genetic ancestry tests attempt to take advantage of the recombination in chromosomes and the predictable rate of random mutations to assign people to geographic regions.¹⁰⁷

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101. Augustine Kong et al., *Rate of De Novo Mutations and the Importance of Father's Age to Disease Risk*, 488 NATURE 471, 472 (2012); See Rocio Acuna-Hidalgo, Joris A. Veltman, & Alexander Hoischen, *New Insights into the Generation and Role of De Novo Mutations in Health and Disease*, 17 GENOME BIOLOGY 241 (2016).
 102. N.H. Barton, *Mutation and the Evolution of Recombination*, 365 PHIL. TRANS. R. SOC. B. 1281 (2010).
 103. *Genotype vs. Phenotype*, UNDERSTANDING EVOLUTION, https://evolution.berkeley.edu/evolibrary/article/genovspheno_01 [<https://perma.cc/36C9-37TJ>] (last visited Aug. 25, 2019).
 104. Joanna L. Mountain & Neil Risch, *Assessing Genetic Contributions to Phenotypic Differences Among 'Racial' and 'Ethnic' Groups*, 36 NATURE GENETICS S48 (2004).
 105. *Frequently Asked Questions About Genetic and Genome Science*, NAT'L HUM. GENOME RES. INST., <https://www.genome.gov/19016904/faq-about-genetic-and-genomic-science/> [<https://perma.cc/QC5Q-ECE6>] (last updated Sept. 7, 2018).
 106. The 1000 Genomes Project Consortium, *A Global Reference for Human Genetic Variation*, 526 NATURE 68 (2015) [hereinafter 1000 Genomes Project].
 107. *What Is Genetic Ancestry Testing?*, U.S. NAT'L LIBRARY OF MED., <https://ghr.nlm.nih.gov/primer/dtcgenetic/ancestrytesting> [<https://perma.cc/36KM-CX5N>] (last visited Jan. 15, 2019).

Broadly, there are two different types of testing under the aegis of ancestry testing: direct lineage tracing and single nucleotide polymorphism testing.¹⁰⁸ Direct lineage tracing focuses on differences on the Y-chromosome and the mitochondrial DNA.¹⁰⁹ Because the Y-chromosome does not undergo recombination during meiosis and always passes from father to son, it can be used to determine paternal lineage based on its calculable mutation rate.¹¹⁰ This allows males to be sorted into haplogroups¹¹¹ that shed light on how different populations migrated out of Africa and subsequently changed during human migration across the earth.¹¹² This analysis can provide clues to the ancestry of contemporary peoples by extrapolating their mutation rate and looking at how the Y-chromosome has changed.¹¹³

Similar to the Y-chromosome, mitochondrial DNA does not undergo recombination;¹¹⁴ however, mitochondrial DNA is always passed from a mother to all of her children without any paternal contribution.¹¹⁵ This, likewise, allows researchers to generate

108. *Id.*

109. *Id.*

110. Elie Dolgin, *Human Mutation Rate Revealed*, NATURE (Aug. 27, 2009), <https://www.nature.com/news/2009/090827/full/news.2009.864.html> [<https://perma.cc/N8PB-KHFB>].

111. A haplogroup is a group of DNA segments that are inherited from a single parent and is helpful in determining how populations migrated through time. *Haplogroups Explained*, 23ANDME (Aug. 25, 2015), <https://blog.23andme.com/ancestry/haplogroups-explained/> [<https://perma.cc/KSZ3-E94L>].

112. See Toomas Kivisild, *The Study of Human Y Chromosome Variation through Ancient DNA*, 135 HUMAN GENETICS 529 (2017).

113. Julie Di Cristofaro et al., *Prehistoric Migrations through the Mediterranean Basin Shaped Corsican Y-Chromosome Diversity*, 13 PLOS ONE 1 (2018); Alexandros Heraclides et al., *Y-Chromosomal Analysis of Greek Cypriots Reveals a Primarily Common Pre-Ottoman Paternal Ancestry with Turkish Cypriots*, PLOS ONE (June 16, 2017), <https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0179474&type=printable> [<https://perma.cc/U5H7-FAPM>].

114. Erik Hagström et al., *No Recombination of mtDNA After Heteroplasmy for 50 Generations in the Mouse Maternal Germline*, 42 NUCLEIC ACIDS RES. 1111, 1111 (2013).

115. Miyuki Sato & Ken Sato, *Maternal Inheritance of Mitochondrial DNA by Diverse Mechanisms to Eliminate Paternal Mitochondrial*

haplogroups that track how ancient populations of people moved throughout the world.¹¹⁶ It even allows tracing of mitochondrial DNA back into evolutionary history, all the way to a prototypical, mitochondrial “Eve.”¹¹⁷ A significant caveat to both of these direct lineage tracing methods is that the results are only directly informative about two of a person’s ancestors—one maternal ancestor for mitochondrial testing and one paternal ancestor for Y-chromosome testing.¹¹⁸ So, if one looks back, for example, 350 years (approximately 14 generations),¹¹⁹ these two tests are each informative about a portion of DNA from *one* male and *one* female ancestor; but, because the number of ancestors doubles each generation, this example yields potentially 16,382 other individuals who also contributed to a user’s DNA.

The other analysis, which can give information on a more significant number of ancestors, looks at a large number of variations across the genome. These differences can be single nucleotide polymorphisms (SNPs) or short-tandem repeats (STRs).¹²⁰ As populations migrated out of Africa,¹²¹ they took

DNA, 1833 *BIOCHIMICA ET BIOPHYSICA ACTA - MOLECULAR CELL RES.* 1979, 1979 (2013); *But see* Shiyu Luo et al., *Biparental Inheritance of Mitochondrial DNA in Humans*, 115 *PNAS* 13039 n. 51 (2018) (demonstrating that in exceptionally rare instances paternal mitochondrial DNA is passed to offspring).

116. *See* Vicente M. Cabrera et al., *Carriers of Mitochondrial DNA Macrohaplogroup L3 Basal Lineages Migrated Back to Africa from Asia Around 70,000 Years Ago*, 18 *BMC EVOLUTIONARY BIOLOGY* 1 (2018).
117. *See* Rebecca L. Cann, Mark Stoneking & Allan C. Wilson, *Mitochondrial DNA and Human Evolution*, 325 *NATURE* 31, 36 (1987).
118. *What Is Genetic Ancestry Testing?*, *supra* note 107.
119. Donn Devine, *How Long Is a Generation? Science Provides an Answer*, 23 *ANC. MAG.* 51, 52 (2005).
120. John M. Butler et al., *STRs vs. SNPs: Thoughts on the Future of Forensic DNA Testing*, 3 *FORENSIC SCI. MED. PATHOLOGY* 200, 200 (2007).
121. Africa is theorized to be the area where Humans first arose as a species. CB Stringer & P Andrews, *Genetic and Fossil Evidence for the Origin of Modern Humans*, 239 *SCIENCE* 1263, 1263 (1988).

with them a baseline of genetic differences.¹²² As these migrating populations spread across the planet, their genetic baseline mutated and recombined further, and these differences became unique to individual populations.¹²³ These unique changes allow researchers to track mutations backward in time like a time-lapse photograph to help determine how people moved and how they are related.¹²⁴

The SNPs used in ancestry testing are called ancestry informative markers (AIMs),¹²⁵ and companies choose them because they show substantial differences among different populations geographically.¹²⁶ This is not to say that they are present in only one population, but that they may be more prevalent in one as compared to another. The data from each person's DNA at these AIMs can then theoretically be used to infer their genetic ancestry.¹²⁷ This is accomplished by checking an individual's AIMs against the reference population and determining where their DNA best matches up.¹²⁸ The reference population is a panel of DNA samples from people each company has determined are representative of different populations.¹²⁹

122. Charmaine D. Royal, et al., *Inferring Genetic Ancestry: Opportunities, Challenges, and Implications*, 86 THE AM. J. OF HUM. GENETICS 661, 665 (2010).

123. This is because of the Founder effect which is, "a special case of random genetic drift in which population size is severely reduced by such events as famine, disease epidemics, or migration of a small subset of individuals to a new homeland." BJB Keats & SL Sherman, *Founder Effect*, SCIENCE DIRECT, <https://www.science-direct.com/topics/agricultural-and-biological-sciences/founder-effect> (last visited Mar. 3, 2020).

124. Royal et. al., *supra* note 124.

125. SHELDON KRIMSKY & DAVID CAY JOHNSTON, ANCESTRY DNA TESTING AND PRIVACY: A CONSUMER GUIDE, COUNCIL FOR RESP. GENETICS, 3 (Mar. 2017), available at <https://web.archive.org/web/20190911202837/>, <http://www.councilforresponsiblegenetics.org/img/Ancestry-DNA-Testing-and-Privacy-Guide.pdf>.

126. *Id.* at 4.

127. *See Ancestry Composition Guide*, *supra* note 12.

128. *Id.*

129. *See Evaluating the AncestryDNA Reference Panel*, ANCESTRYDNA, <https://www.ancestry.com/cs/dna-help/ethnicity/reference-panel> [<https://perma.cc/742P-RUZ9>] (last visited Mar. 10, 2019).

C. *Criticisms of Current Ancestry Testing*

While genetic ancestry testing is built on the legitimate science of population genetics,¹³⁰ it is not perfect in method or result, and it is subject to several criticisms. An important distinction is that population genetics is used to examine whole populations and how they evolve, not individual members of a population which is what these companies are offering. It is crucial to elucidate precisely what populations of people companies compare users against when they submit their samples for testing. The comparator is the reference population.

1. Reference Populations

Each company chooses what data to place into its reference population,¹³¹ but who makes up the reference population is secret. These reference populations are not created using material from ancestral sources as one might think is necessary for genetic ancestry testing. So-called “ancient” DNA, or DNA from ancient human remains, is not used to generate a panel to compare users against.¹³² Instead, reference populations are built from *contemporary* populations using both publicly available and private data.¹³³ Sometimes, companies build these reference

130. *Population Genetics*, U. OF LEICESTER, <https://www2.le.ac.uk/projects/vgec/highereducation/topics/population-genetics> [<https://perma.cc/TG58-T5NX>] (last visited Sept. 22, 2019) (“Population genetics is the study of genetic variation within populations, and involves the examination and modelling of changes in the frequencies of genes and alleles in populations over space and time.”).

131. KRIMSKY & JOHNSTON, *supra* note 125, at 3–4.

132. Ancient DNA are samples isolated from ancient human remains. Often studies using these samples can show how DNA sequences have changed in one area over a long period of time and shed light on how populations migrated in and around the area. Iain Mathiseon et al., *Genome-Wide Patterns of Selection in 230 Ancient Eurasians*, 528 NATURE 499 (2015); Eric Hamilton, *DNA Testing Companies: What They Can and Cannot Reveal about Your Ancestry*, NATURE WORLD NEWS (July 24, 2019, 9:08 AM), <https://www.natureworldnews.com/articles/41837/20190724/dna-testing-companies-what-they-can-and-cannot-reveal-about-your-ancestry.htm> [<https://perma.cc/KF6W-JBGG>].

133. Eric Boodman, *White Nationalists Are Flocking to Genetic Ancestry Tests. Some Don't Like What They Find*, STAT NEWS (Aug. 16, 2017), <https://www.statnews.com/2017/08/16/white-nationalists-genetic-ancestry-test/> [<https://perma.cc/7D82->

populations from the people who purchase the test seeking to learn more about their own ancestry.¹³⁴ A product specialist for one of the major testing companies stated that “[w]hen a [user] tells us that they have four grandparents all born in the same country — and the country is not a colonial nation like the U.S., Canada, or Australia — that person becomes a candidate for inclusion in the reference data.”¹³⁵ The inclusion of these users in the reference population relies on the assumption that a user who has four grandparents born in the same country also has DNA representative of ancestry from that country. So, what these tests actually tell users is how similar their DNA is to other contemporary people, based on the assumption that their ancestors also lived in those regions and that their ancestors were correctly informed of their own ancestry. In the future, research into using DNA from ancient remains could provide a more reliable method to link current peoples to ancestral regions.

Additionally—and essential for a discussion on race-based affirmative-action programs—the reference population used is essential in assigning users to certain African populations. African populations are more genetically diverse than other populations because humans evolved in Africa and the populations there have accumulated more mutations.¹³⁶ So, a reference population may not accurately reflect true human genetic diversity if it is not large enough and does not include an accurate mix of populations. If that reference population is not representative, then it cannot be relied upon to give an accurate reflection of actual ancestry.

2. Ancestry Informative Markers

The results a customer receives from genetic ancestry testing can depend in large part on the number and type of ancestry

EXPC]; *New African & East Asian Details in 23andMe's Latest Ancestry Composition Update*, 23ANDME (Aug. 16, 2017), <https://blog.23andme.com/ancestry/new-african-east-asian-details-in-23andmes-latest-ancestry-composition-update/> [https://perma.cc/38EX-L3S6].

134. Boodman, *supra* note 133.

135. *Id.*

136. Felicia Gomez, Jibril Hirbo & Sarah A. Tishkoff. *Genetic Variation and Adaptation in Africa: Implications for Human Evolution and Disease*, COLD SPRING HARBOR PERSP. IN BIOLOGY 1, 1 (2014).

informative markers used.¹³⁷ Each company has a proprietary panel of markers.¹³⁸ This can result in significant variations in ancestry estimates, and because the markers each company uses are not shared publicly, it is difficult to determine their accuracy.¹³⁹ Additionally, while AIMs are present in different frequencies in a population, they are very rarely unique to a single population.¹⁴⁰ So, an inference to a particular population may be incorrect, even if a user shares AIMs with a company's reference population.

Furthermore, even if AIMs do track with geographical region, how many are necessary to confer "race?" Similar to the issues present with the reference population each company uses, each company is free to select which AIMs to test and how to weight the results. The AIMs used are, in part, derived from and compared to the reference population, so having an over-representation of people from one geographic area can also skew results.¹⁴¹ Importantly, different companies can reach different conclusions about the same user's ancestry because they choose different panels of AIMs.

3. Algorithms

For one to use DNA ancestry estimates as proof of minority status, the results must be accurate and correct – that is, with no or very few false positives that show minority ancestry. Accuracy is crucial because allowing a person to qualify as a minority based on a false positive or algorithmic error undermines both affirmative action programs and the reliability of the tests.

These DTC genetic-testing companies display ancestry by giving users a percentage for both broad regions and individual countries where their DNA matches.¹⁴² These results are

137. KRIMSKY & JOHNSTON, *supra* note 125, at 3.

138. *Id.*

139. Jacobo Pardo-Seco, Federico Martín-Torres, & Antonio Salas, *Evaluating the Accuracy of AIM Panels at Quantifying Genome Ancestry*, 15 BMC GENOMICS 543, 555 (2014).

140. See Fernando A. Villanea, et al., *Brief Communication: Evolution of a Specific O Allele (O1vG542A) Supports Unique Ancestry of Native Americans*, 151 AM. J. PHYSICAL ANTHRO. 649, 650 (2013).

141. See Troy Duster, *Ancestry Testing and DNA: Uses, Limits, and Caveat Emptor*, COUNCIL FOR RESP. GENETICS (2009).

142. *Ancestry Composition Guide*, *supra* note 12.

generated using complex algorithms to compare a user's DNA to the company's reference population.¹⁴³ Using these algorithms, companies assign different segments of DNA as originating in different populations of people from different regions or countries.¹⁴⁴ However, these mathematical calculations are, at best, opaque.¹⁴⁵ Companies keep their algorithms confidential and reveal only general details that are mostly common to all companies.¹⁴⁶ Because these algorithms are secret, neither users nor the scientific community have a way of judging how accurate they are. One company explicitly admits that the ancestry results in its final report are a “best-guess” of the user's ancestry.¹⁴⁷

In addition to being secret, these algorithms are not static.¹⁴⁸ The companies can—and do—tweak the underlying equations at any time, as well as change what groups they include in reference populations.¹⁴⁹ These changes have resulted in ancestry results being “updated.”¹⁵⁰ In one instance, these updates changed the ancestry results for 10 million users—sometimes dramatically.¹⁵¹ Such an “update” could be especially problematic if someone were initially assigned minority ancestry and certified for an affirmative action program, but their results were later changed

143. *How Ancestry Composition Works*, 23ANDME, <https://customercare.23andme.com/hc/en-us/articles/115004339467-How-Ancestry-Composition-Works> [<https://perma.cc/PG5B-773Q>] (last visited Aug. 26, 2019).

144. *See The Science Behind a More Precise DNA Matching Algorithm*, ANCESTRY (May 3, 2016), <https://blogs.ancestry.com/ancestry/2016/05/03/the-science-behind-a-more-precise-dna-matching-algorithm/> [<https://perma.cc/V93Y-7LB2>]; *Ancestry Composition Guide*, *supra* note 12.

145. *Ancestry Composition Guide*, *supra* note 12.

146. *See Id.*

147. Katie Welka, *New Feature: Your Family DNA Views*, LIVINGDNA (June 18, 2017), <https://livingdna.com/news/new-feature-your-family-dna-views> [<https://perma.cc/3Z3G-4LGL>].

148. Marc Daadler, *Ancestry.com Changed How it Determines Ethnicity and People are Upset*, DETROIT FREE PRESS (Sept. 19, 2018, 6:25 AM), <https://www.freep.com/story/life/2018/09/18/ancestry-dna-update-ethnicity/1343953002> [<https://perma.cc/3RAK-KUN3>].

149. *Id.*

150. *Id.*

151. *Id.*

and that ancestry marker removed. In such a case, a formerly minority-business owner or student who initially benefited from affirmative action policies would have no incentive to share this update with administrators and risk losing benefits gained.

4. Concordance Between Companies

A significant (and possibly insurmountable) problem to allowing genetic ancestry tests to establish minority status emerges when comparing the results from different tests – and sometimes even when comparing one user’s results within the same company. In one striking example, a set of identical twins sent samples to five different companies to compare results.¹⁵² They found that each company gave a different ancestry result, and in some cases, the same company gave different results between the twins.¹⁵³ For example, one twin had “nearly 10 per cent less “broadly European” ancestry than [the other].”¹⁵⁴ After downloading the raw data and having it examined by independent experts, they confirmed that their DNA samples were 99 percent identical.¹⁵⁵ Even those who examined the raw data were shocked to see such discordant ancestry results.¹⁵⁶ In another shocking example, one company was not able to differentiate between DNA from a dog and a human.¹⁵⁷

Direct-to-Consumer genetic testing has opened a world of possibilities for the general public to examine their genome in an accessible manner. While these tests are based on legitimate

152. CBC News, *Twins Get ‘Mystifying’ DNA Ancestry Test Results (Marketplace)*, YOUTUBE (Jan. 18, 2019), <https://www.youtube.com/watch?v=Isa5c1p6aC0>; Charlsie Argo & Luke Denne, *Twins Get Some ‘Mystifying’ Results When They Put 5 DNA Ancestry Kits to the Test*, CBC NEWS (Jan. 18, 2019), <https://www.cbc.ca/news/technology/dna-ancestry-kits-twins-marketplace-1.4980976> [<https://perma.cc/2WKR-GS9E>].

153. Argo & Denne, *supra* note 152.

154. *Id.*

155. *Id.*

156. *Id.*

157. One company tested was not able to detect that instead of a human sample a canine sample was submitted and output results. Phil Rogers, Lisa Capitanini, & Courtney Copenhagen, *Home DNA Kits: What Do They Tell You?*, NBC CHICAGO (Apr. 30, 2018, 11:10 PM), <https://www.nbcchicago.com/investigations/home-dna-kits-481292431.html> [<https://perma.cc/UW4Z-724G>].

science, the technology and analysis is still relatively new and rife with caveats, as discussed above. Consequently, the results generated by these tests may be confusing to users, especially when combined with advertising campaigns and lack of scientific knowledge.¹⁵⁸ The public and government may not be sophisticated enough to accurately critique these tests but that will not stop some from taking the results at face value and attempting to use them in ways that their creators never intended. One such unintended use is taking the results from these tests and apply for affirmative action programs designed to assist minorities.

III. SHOULD AFFIRMATIVE ACTION PROGRAMS ACCEPT GENETIC ANCESTRY TESTS?

Knowing the science behind and limitations of ancestry tests, the question is: should affirmative action programs accept these tests as anything more than the scientific equivalent of a party trick?

A. *Legislative Intent of Affirmative Action Programs*

When deciding if and how ancestry tests should fit into affirmative action programs, the first consideration to take into account is the intent of Congress to help socially disadvantaged minorities in passing affirmative-action laws.

1. Remedial Programs

In amending the SBA to create a new racially based remedial 8(a) program, Congress found,

that the opportunity for full participation in our free enterprise system by socially and economically disadvantaged persons is essential if we are to obtain social and economic equality for such persons and improve the functioning of our national economy . . . that many such persons are socially disadvantaged because of their identification as members of certain groups that have

158. Elle Hunt, ‘*Your Father’s Not Your Father*’: *When DNA Tests Reveal More than You Bargained for*, THE GUARDIAN (Sept. 18, 2018), <https://www.theguardian.com/lifeandstyle/2018/sep/18/your-fathers-not-your-father-when-dna-tests-reveal-more-than-you-bargained-for> [<https://perma.cc/D53U-W7VT>].

suffered the effects of discriminatory practices or similar invidious circumstances over which they have no control.¹⁵⁹

Socially and economically disadvantaged individuals were given the same meaning in the in DBE legislation.¹⁶⁰ Likewise, in reauthorizing the program in 2012, Congress recognized the importance of the program, stating: “while significant progress has occurred due to the establishment of the disadvantaged business enterprise program, discrimination and related barriers continue to pose significant obstacles for minority . . . owned businesses seeking to do business in federally-assisted surface transportation markets across the United States.”¹⁶¹

Allowing White-presenting individuals to use ancestry tests from private companies to gain preferential access to government programs, employment, or educational opportunities that were meant to help minorities smacks of continuing exploitation by the privileged majority. While some people may legitimately incorporate these results into their identity, they will not have experienced the type of discriminatory practices contemplated in the enabling statutes.

2. Diversity

The intent behind the University admissions policy in the seminal Supreme Court case *Grutter v. Bollinger* was a desire to create a diverse learning environment.¹⁶² The University policy focused on enrolling a “critical mass” of minority students to promote “cross-racial understanding and the breaking down of racial stereotypes” and to “ensure [minority students’] ability to make unique contributions to the character of the Law School.”¹⁶³

Additionally, Congress’ purpose in enacting Title VII’s ban on hiring based on race was first and foremost, “the plight of the Negro in [the] economy.”¹⁶⁴ It was not Congress’ intention to give

159. Small Business Act and the Small Business Investment Act, Pub. L. No. 95-507, § 201, 92 Stat. 1757, 1760 (1978).

160. *Compare id.*, and Surface Transportation Assistance Act, Pub. L. No. 97-424, 96 Stat. 2097 (1983).

161. Moving Ahead for Progress in the 21st Century Act, Pub. L. No. 112-141, § 1101(b), 126 Stat. 405, 415 (2012).

162. *Grutter v. Bollinger*, 539 U.S. 306, 316 (2003).

163. *Id.* at 308, 316.

164. 110 CONG. REC. 6548 (1964) (remarks of Sen. Humphrey).

White workers a cudgel so that they might beat back the attempts of private employers to institute voluntary affirmative action programs. Allowing genetic ancestry tests alone to qualify a prospective student or employee as a minority is to subsume Congress' original intent.

B. How to Incorporate Genetic Ancestry Tests

The proximity of early settlers to Native Americans and the existence of slaves in the colonies was bound to lead to marriages and children of mixed race.¹⁶⁵ How the courts and legislatures of the time classified and analyzed these marriages and children may provide insight into how genetic ancestry results should be applied today in determining minority status.

1. Early Judicial and Legislative Views of Race

One of the earliest court proceedings involving a person of mixed race—*In re Mulatto*, decided in 1656—demonstrates how colonists viewed mixed-race individuals.¹⁶⁶ The decision is one sentence that declares “Mulatto¹⁶⁷ held to be a slave and appeal taken.”¹⁶⁸ Whatever the court’s reasoning behind this decision, it can be argued that it signifies that the person’s part-European ancestry made no difference. If it had, they would not have been forced into servitude.¹⁶⁹

Among the first legislative decisions concerning race and minority status extended the shackles of servitude to “mulatto” children in 1662, thereby broadening the definition of who was a slave to include mixed-race individuals.¹⁷⁰ This Virginia law may

165. Christine B. Hickman, *The Devil and the One Drop Rule: Racial Categories, African Americans, and the U.S. Census*, 95 MICH. L. REV. 1161, 1171 (1997).

166. See *In re Mulatto*, McIlwaine 504 (1656).

167. Mulatto is an archaic term for children born to one White parent and one non-White parent (often a Black parent). See *Thurman v. State*, 18 Ala. 276, 278 (1850).

168. *In re Mulatto*, McIlwaine 504 (1656).

169. Hickman, *supra* note 165, at 1174.

170. VA. SLAVE AND INDENTURE LAWS, 1662, 14 Car. Act XII § 2:170 (“WHEREAS some doubts have arisen[sic] whether children got by any Englishman upon a negro woman should be slave or ffree, [sic] *Be it therefore enacted and declared by this present grand*

be the first instance in which colonies used ancestry—and by implication, genetics—to determine “minority” status.¹⁷¹ The law stated that as long as an individual was born to an enslaved mother, she will always be considered a slave regardless of her appearance, the status of her father, or the percentage of her European ancestry.¹⁷² Deciding that any child born of an Englishman and a slave is also a slave placed mixed-race individuals squarely in the same category as the African slaves.¹⁷³ This law, in conjunction with *In re Mulatto*, is arguably a precursor to the later established—and infamous—“one-drop rule.”¹⁷⁴

In *Gentry v. McMinnis*, the court of appeals for Kentucky, in determining whether or not a certain woman was a slave, stated, “[t]he rule is, that a person visibly a negro, is *prima facie* slave.”¹⁷⁵ This decision demonstrates that for the Kentucky court, race was based on the subjective measure of the color of a person’s skin, rather than on percentage of blood.¹⁷⁶ Although the court

assembly, that all children borne in this country shalbe[sic] held bond or free only according to the condition of the mother.”).

171. This law was a marked deviation from English common law where children had the legal status of their father regarding servitude and created a system where masters could have children with their slaves and legally enslave them; JAMES CURTIS BALLAGH, *A HISTORY OF SLAVERY IN VIRGINIA* 38–39 (1902).
172. VA. SLAVE AND INDENTURE LAWS, 1662, 14 Car. Act XII § 2:170.
173. Hickman, *supra* note 165, at 1175–1176.
174. This is also called the rule of hypodescent which automatically assigns mixed children to the minority group between the two parents. Conrad P. Kottak, *Human Diversity and “Race”*, MCGRAW HILL (Aug. 14, 2010), https://web.archive.org/web/20100814151158/http://highered.mcgraw-hill.com/sites/0072500506/student_view0/chapter5/faqs.html.
175. *Gentry v. McMinnis*, 33 Ky. 382, 385 (1835).
176. *Id.*; see also VA. CODE § 49 (1887), amended by VA. CODE ANN. § 49 (Ch. 357) (2010) (“Every person having one-sixteenth or more of negro blood shall be deemed a colored person, and every person not a colored person having one-fourth or more of Indian blood shall be deemed an Indian.”); See Keneisha M. Green, *Who’s Who: Exploring the Discrepancy Between the Methods of Defining African Americans and Native Americans*, 31 AM. INDIAN L. REV. 93 (2006) (explaining thoroughly how African American and Native Americans were differently defined).

did not know it at the time, its decision emphasized phenotype over genotype in determining minority status.

Another early measure of note is legislation that forbade fornication or marriage between Whites and non-Whites, also known as “miscegenation laws.” In deciding whether marriages should be held valid, courts offered a view into what “removes” a person from the White race or constitutes a person of color.¹⁷⁷ For example, in *State v. Melton*, the North Carolina Supreme court stated that according to the laws of the state, the defendant was generationally removed from his Native American ancestor and so he could not be guilty of the crime of fornication with a White woman, as alleged by the state.¹⁷⁸ Thus, according to the courts and legislature, it was possible for the minority blood of a person’s ancestor to be diluted enough through the generations for a person to no longer be considered a minority.

2. One-Drop Rule

The Jim Crow era, ushered in by the case *Plessy v. Ferguson*, which established the doctrine of separate but equal, saw a dramatic shift away from the more flexible definitions of minority status.¹⁷⁹ Homer Plessy, the named plaintiff, outwardly appeared to be a White man, but was one-eighth Black.¹⁸⁰ This made him a “colored” man in the state of Louisiana.¹⁸¹ The Court ultimately held the idea of separate but equal as constitutional, but averred on the issue of what constitutes a “colored” person, declaring that it was up to each state to decide for itself.¹⁸² After *Plessy*, several more states passed laws expanding the reach of existing ancestry laws.¹⁸³ These laws were much more restrictive than their colonial counterparts and greatly restricted who qualified as White in order to strengthen and further entrench segregationist policies.¹⁸⁴ Some states, like Arkansas, went as far as to codify the “one-

177. See *State v. Melton*, 44 N.C. 49, 51 (1852).

178. *Id.* at 52.

179. See *Plessy v. Ferguson*, 163 U.S. 537, 552 (1896).

180. *Id.* at 538.

181. *Id.*

182. *Id.* at 552.

183. See PAULI MURRAY, STATES’ LAWS ON RACE AND COLOR 39–40 (1950).

184. See *id.*

drop” rule so that any known African ancestry, no matter how distant, classified a person as a “negro.”¹⁸⁵ Under this logic, even the smallest trace of minority ancestry from a genetic ancestry test should qualify a person as a minority.

A parallel series of cases examined the issue of who is considered White rather than “colored.” Beginning at the country’s formation until the 1950s, “Whiteness” was a prerequisite for gaining citizenship by naturalization.¹⁸⁶ In one of the earliest cases, *In re Ah Yup*, a federal court denied citizenship to a Chinese immigrant because he was not “White” as required by law for naturalization.¹⁸⁷ In its decision, the court relied on both the “common knowledge” of Whiteness, as well as contemporary “scientific evidence” developed by naturalists, like Carl Linnaeus, during the Enlightenment, although this evidence was based on racist misconceptions.¹⁸⁸

The *Ah Yup* court was unique in applying both common knowledge and scientific rationale, as later decisions relied on one or the other.¹⁸⁹ Courts vacillated between the two standards, using them essentially interchangeably until presented with immigrants who were “scientifically” classified as Caucasian but presented dark colored skin.¹⁹⁰ Two cases decided in the same year by the Supreme Court resulted in the Court eschewing scientific classifications for common knowledge.¹⁹¹ The Court stated, “the

185. *Id.* at 39.

186. This is in contrast to the doctrine of *jus soli*, established after the passage of the Fourteenth Amendment in 1868 and the decision in *US v. Wong Kim Ark*, 169 U.S. 649 (1898), where anyone born within the borders of the country is granted citizenship at birth. Act of March 26, 1790, Ch. 3, 1 Stat. 103, *repealed by* Act of Jan. 29, 1795, Ch. 20, 1 Stat. 414; IAN HANEY-LÓPEZ, *WHITE BY LAW: THE LEGAL CONSTRUCTION OF RACE* 1 (2d ed. 2006).

187. *In re Ah Yup*, 1 F. Cas. 223, 224–25 (D. Cal. 1878).

188. HANEY-LÓPEZ, *supra* note 186 at 4; *see generally* CARL LINNAEUS, *SYSTEMA NATURAE* 20–22 (1735). Linnaeus separates humanity into four major groupings: *Europaeus*, *Americanus*, *Asiaticus*, and *Africanus*. These were meant to describe Europeans, Asians, Africans, and the Indigenous peoples of the Americas. *See id.*

189. HANEY-LÓPEZ, *supra* note 186, at 4–5.

190. *Id.*

191. *See Ozawa v. U.S.*, 43 S.Ct. 65, 68 (1922); *United States v. Bhagat Singh Thind*, 261 U.S. 204, 214 (1923).

words ‘free white persons’ are words of common speech, to be interpreted in accordance with the understanding of the common man, synonymous with the word ‘Caucasian’ only as that word is popularly understood.”¹⁹² Though it may not have been cognizant of this, the Court articulated an important tenant of “Whiteness” in American society.¹⁹³ That is, visible admixture from a non-White race decreases “Whiteness” or removes one from the White race regardless of actual ancestry.

3. Where do Genetics Ancestry Tests Fit?

The cases and legislative decisions leading up to the Civil War and subsequent Jim Crow era demonstrate flexibility in determining minority status that could similarly apply to use of genetic ancestry tests to determine if someone is a minority. The reasoning that through generations a minority ancestor’s blood is diluted lends itself to an argument that tiny percentages of minority DNA reported by genetic ancestry tests should similarly not qualify one as a minority because the reported ancestry is too far removed.

Conversely, the “one-drop rule” logic that many state legislatures from the Jim Crow era adopted would cause any trace of minority ancestry to qualify a person as a minority. According to this approach, results from genetic ancestry tests should be permitted to qualify an individual as a minority for affirmative action programs, even if they report a tiny but demonstrable amount of minority ancestry. Although this approach has no basis in science, it still holds some cultural significance.

Examining the history of how race was handled in the United States presents two ideas on how genetic ancestry tests might be incorporated into the current affirmative action framework. However, these two ideas are at odds with each other. From the starting point of these basic ideas can regulatory guidelines be considered.

192. *United States v. Bhagat Singh Thind*, 261 U.S. 204, 214–15 (1923).

193. “The children of English, French, German, Italian, Scandinavian, and other Europe parentage, quickly merge into the mass of our population and lose the distinctive hallmarks of their European origin. On the other hand, it cannot be doubted that the children born in this country of Hindu parents would retain indefinitely the clear evidence of their ancestry.” *United States v. Bhagat Singh Thind*, 261 U.S. 204, 215 (1923).

IV. RECOMMENDATIONS FOR REGULATORY GUIDELINES

There are a variety of options to address how, and if, affirmative action programs should incorporate genetic ancestry tests.

A. *One-Drop Rule*

As discussed previously, the one-drop rule has played a dominant role in developing notions of race in the United States, even before the country's founding. While the one-drop rule may no longer have legal force anywhere in the country—and for good reason—its enshrined vestiges remain.¹⁹⁴ Some suggest that as invidious as the practice was in perpetuating slavery and other racist policies, it was also instrumental in creating the current Black community.¹⁹⁵ Applying the one-drop rule is the most straightforward method for allowing genetic ancestry tests. Under this regime, any trace of minority ancestry would qualify a user to participate in the programs. Taking the results of genetic ancestry tests and applying the one-drop rule is in keeping with the history of this country, but historically situations in which the one-drop rule was applied were when a person had a discernable mix of races.¹⁹⁶ Those attempting to apply the one-drop rule to genetic ancestry tests will likely be the opposite and appear White but try to use the racist rule to their advantage.

With so many companies offering ancestry tests, a rule of hypodescent will likely result in people shopping around to different companies in hopes of striking gold and establishing a sufficient percentage of minority ancestry under the law. In the worst-case scenario, companies may develop and offer fraudulent tests to take advantage of affirmative action programs. A situation like this appears to have occurred in Canada where the

194. For example, Barack Obama on his 2010 census questionnaire indicated his race as Black even though he is the son of a White woman and Black man. *See, e.g.*, Sam Roberts & Peter Baker, *Asked to Declare his Race, Obama Checks 'Black'*, N.Y. TIMES (Apr. 2, 2010), <https://www.nytimes.com/2010/04/03/us/politics/03census.html> [<https://perma.cc/QQS2-QBNQ>].

195. Hickman, *supra* note 165, at 1166.

196. *See* Steve Bradt, *'One-Drop rule' persists*, THE HARVARD GAZETTE (Dec. 9, 2010), <https://news.harvard.edu/gazette/story/2010/12/one-drop-rule-persists/> [<https://perma.cc/7RHE-VMQX>].

government offers benefits to indigenous peoples.¹⁹⁷ A group not recognized by the Canadian government named the Confederation of Aboriginal People of Canada (CAPC) relies solely on genetic ancestry tests to confer membership.¹⁹⁸ CAPC will even arrange DNA tests for prospective members;¹⁹⁹ however, the testing company CAPC works with appears to have created a fraudulent assay to allow non-indigenous people to obtain results that state that the user has indigenous ancestry and from what tribe they descend.²⁰⁰ In one instance, a suspicious user tested the company with samples from a dog.²⁰¹ The results showed that the test was both unable to tell the difference between canine and human DNA, but also claimed the dogs had indigenous ancestry.²⁰²

The government or employee reviewing the results of a test has no way of telling which companies are scientifically and statistically rigorous in their analysis and which are potentially fraudulent. If a similar scenario occurred in the United States, it could potentially undermine affirmative action programs and lead to greater distrust of legitimate science. Being certified under the 8(a) or DBE program could mean millions in contract dollars and gaining admission to an elite college could change one's life forever. Spending a few hundred or even a thousand dollars on a simple genetic test is a natural choice when the opportunity to benefit is so great.

B. Genealogical Tracing

The government could require that if an applicant wishes to use a genetic ancestry test, the results must also be accompanied by genealogical tracing. This method involves looking at birth, death, census, immigration, and other historical records in an attempt to build a family history – the traditional process of

197. Jorge Barrera & Tiffany Foxcroft, *Heredity or Hoax? How Dog DNA Helped Uncover a Suspected Indian Status Scam*, CBC NEWS (June 13, 2018), <https://newsinteractives.cbc.ca/longform/dna-ancestry-test> [<https://perma.cc/7KDN-W6NX>].

198. *Id.*

199. *Id.*

200. *Id.*

201. *Id.*

202. *Id.*

creating a family tree before genetic ancestry testing existed.²⁰³ This process has also been suggested as one method for determining which people should benefit from proposed reparations for slavery.²⁰⁴

Genealogical tracing could help explain a low percentage of minority ancestry and prevent people who receive false positives from entering programs because they would require showing who the minority ancestor in a person's family tree is. With the advent and widespread adoption of the Internet and digitization of records, this possibility is more viable,²⁰⁵ but it can still be difficult for some people to accomplish as records of some populations were destroyed or never kept. For example, it was illegal to teach slaves to read and write in many parts of the country, so family history was not kept.²⁰⁶ This process is also very time consuming, and those lacking sufficient financial resources to undergo testing may not be able to do so. Moreover, in some cases, genealogical tracing could lead to people who appear White successfully claiming minority status because their records are sufficiently detailed, even if their ancestors are very distant.²⁰⁷ This outcome would

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203. Ann Lawthers, *Getting Started*, AMERICAN ANCESTORS, <https://www.americanancestors.org/education/learning-resources/read/getting-started> [<https://perma.cc/V9FZ-EKHN>] (last visited Sept. 22, 2019).
204. Kevin Hopkins, *Forgive U.S. Our Debts? Righting the Wrongs of Slavery*, 89 GEO. L. J. 2531, 2542 (2001).
205. Joanna Walters, *African American Family Records from Era of Slavery to Be Available Free Online*, THE GUARDIAN (June 20, 2015, 5:08 PM), <https://www.theguardian.com/lifeandstyle/2015/jun/20/african-american-family-records-slavery-available-free-online> [<https://perma.cc/KC4J-2SSL>].
206. ANGELA Y. DAVIS, *WOMEN, RACE, & CLASS 106* (1983) (“With the exception of Maryland and Kentucky, every Southern state absolutely prohibited the education of slaves.”).
207. As an example of the potential for this scenario, the actor Ty Burrell with the help of the PBS program “Finding Your Roots” discovered he has a Black ancestor, five generations removed, who was born from a master raping of a slave. Ty Burrell himself appears to be White and the process to discover his Black ancestors was very onerous. See Gina Carbone, *Ty Burrell Just Learned the Shocking Story of His Black Slave Ancestors*, MOVIE FONE (Jan. 6th, 2016), available at <https://www.moviefone.com/2016/01/06/ty-burrell-just-learned-the-powerful-story-of-his-black-slave-ancestors/>.

allow those who have not experienced discrimination based on race to claim benefits simply because they have the means to find a distant minority relative. This is, in effect, a further perversion of the “one-drop” rule to benefit the majority.

C. Establish a Minimum Percentage of Minority Ancestry

Affirmative action programs could allow the use of genetic ancestry tests as qualification but institute a cutoff below which the test no longer qualifies the applicant. This type of determination was done in the past as discussed in the previous section based on blood percentage. Some research suggests that below roughly 25% Black minority ancestry is where mixed-race individuals begin to self-identify as White.²⁰⁸ However, because of the legacy and tradition of slavery (i.e., masters raping female slaves) in the South, some portion of self-identified White people would be included in the cutoff. Such a result would go against the legislative intent of the law because those who self-identify as White likely have not faced discrimination. A further complication is whether each minority group must have a unique cutoff, if studies are needed to determine said on a case by case basis, or if there is an acceptable universal cutoff. Because of these problems, picking a bright line number where people are considered minorities divorced from their lived experiences is not a workable standard.

D. Develop a Government Sanctioned and Standardized Test

The government could create a standardized ancestry test to apply to applicants who wish to use genetic ancestry results for certification or to confirm the results of a commercial test or contract with a private company to do so. However, this solution would be costly to administer and would require the government to either create a sanctioned genetic ancestry test or to contract with a private company. While many states have mandated genetic testing at birth for certain genetic diseases, a government program to collect DNA of applicants is likely to be very

208. Katarzyna Bryc, et al., *The Genetic Ancestry of African Americans, Latinos, and European Americans Across the United States*, 96 THE AM. J. OF HUM. GENETICS 37, 47 (2015) (showing an inflection point of around 28% African ancestry above which people identify as African American and below people identify as European when asked to self-identifying before knowing the results of the test).

unpopular.²⁰⁹ Moreover, such a rigid test might be unconstitutional under current Supreme Court doctrine.²¹⁰ Finally, contracting out to a private company presents challenges such as choosing a company with the best or most accurate test to use, as well as raises the same concern about allowing the tests in general.

E. Require Additional Sworn Affidavit to Bolster Genetic Ancestry Testing

There is a growing body of social science research about how people incorporate minority ancestry results.²¹¹ Many “cherry-pick” the results they want while rejecting others with which they do not wish to identify.²¹² With this research in mind, the agency running the program could alternatively require that, if an applicant wishes to use a genetic ancestry test result to establish minority status, they must submit an additional affidavit showing that they have incorporated their test results into their daily life by associating with their newfound ancestral group. This option seems the easiest to circumvent and requires those administering programs to do much more work to verify the veracity of affidavits. In a perfect world, this could be a solution to the problem, but the ease with which people could lie makes this option untenable.

F. Disallow Genetic Ancestry Testing as Proof of Minority Status

The problems with genetic ancestry testing outlined above show that in its current form, the tests between companies are too unreliable, may not represent true ancestry, and the results are too fluid. The tests are in the hands of private companies, with private reference databases, and proprietary algorithms.²¹³

209. *What Disorders Are Included in Newborn Screening?*, U.S. NAT'L LIBRARY OF MED. (July 2015), <https://ghr.nlm.nih.gov/primer/newbornscreening/nbsdisorders> [<https://perma.cc/9NDF-K3R3>].

210. *See* *Grutter v. Bollinger*, 539 U.S. 306, 306 (2003).

211. *See, e.g.*, Wendy D. Roth & Biorn Ivemark, *Genetic Options: The Impact of Genetic Ancestry Testing on Consumers' Racial and Ethnic Identities*, 124 AM. J. OF SOC. 150, 150 (2018).

212. *Id.*

213. Adam Rutherford, *How Accurate Are Online DNA Tests?*, SCIENTIFIC AM. (Oct. 15, 2018), <https://www.scientificamerican>

Affirmative action programs are essential to help remedy past injustices suffered by minorities in this country.²¹⁴ As it currently stands, an ancestry test by itself should never be dispositive of minority status. Attempts by outwardly appearing non-minorities to “game” the system by using genetic ancestry to gain access to affirmative action programs meant to help minorities overcome discriminatory practices have the potential to undermine public and legislative support. This would only serve to harm those whom these programs were meant to help. Preventing this is imperative at a time when affirmative action programs are facing renewed attacks on their legitimacy.²¹⁵ Accordingly, until a fairer standard emerges, agencies and other institutions that administer affirmative action programs should reject genetic ancestry tests.

CONCLUSION

Genetic ancestry tests remain firmly in the realm of entertainment, and the ancestry results cannot be accepted with the scientific certainty that their advertisements suggest. At this moment, with all the choices that companies are able to make, the tests are as much art as they are science. Even if a person receives ancestry results showing that they have African or any other ancestry, and then incorporates it into their life with sincerity, this does not suddenly make them a member of a minority group for legislative purposes.²¹⁶ There is a difference

.com/article/how-accurate-are-online-dna-tests/ [https://perma.cc/XW3U-QU5T].

214. See *United States v. Stanley*, 109 U.S. 3, 24 (1883).
215. See Michelle Chen, *Affirmative Action Under Attack*, THE NATION (Aug. 31, 2018), <https://www.thenation.com/article/affirmative-action-under-attack/> [https://perma.cc/74A5-LP3Q]; Erica L. Green, Matt Apuzzo & Katie Benner, *Trump Officials Reverse Obama’s Policy on Affirmative Action in Schools*, N.Y. TIMES (July 3, 2018), <https://www.nytimes.com/2018/07/03/us/politics/trump-affirmative-action-race-schools.html> [https://perma.cc/3LVA-8BL3]; Amemona Hartocollis, *U.N.C. Admissions Lawsuit Brings Another Attack on Affirmative Action*, N.Y. TIMES (Jan. 18, 2019), <https://www.nytimes.com/2019/01/18/us/unc-affirmative-action-lawsuit.html>.
216. See Small Business Act and the Small Business Investment Act, Pub. L. No. 95-507, § 201, 92 Stat. 1757, 1760 (1978) (finding “that many [minorities] are socially disadvantaged because of their identification as members of certain groups that have suffered the

between someone believing they are a member of a racial group and functioning as a member of that race in society. Even if a genetic ancestry test magically conferred some greater Black racial identity on an otherwise White person, that does not mean they suddenly function as Black in society.

All states should update their regulations to include the same rebuttable presumption of the federal regulations and allow those administering the programs to make common sense judgments. More importantly, agencies should set a bright line rule that these tests cannot be used to substantiate minority status. Those who need to depend on a genetic ancestry test to prove they are a socially disadvantaged minority have probably never faced the type of discrimination that the 8(a) or DBE program and race-conscious hiring and school admission were created to address.

effects of discriminatory practices or similar invidious circumstances over which they have no control”) (emphasis added).

