Facing the Facts About Test Score Gaps

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Abstract

I review a diverse collection of research findings on differences in average intelligence test scores between socially defined racial groups and argue that these test score gaps are partly attributable to genetic variation across biogeographic ancestries such as African, East Asian, and European ancestries. I focus on the U.S. Black-white test score gap for which the evidence is most comprehensive. The strictly enforced public dogma that the causes of the Black-white test score gap are entirely environmental is no longer empirically plausible given currently available evidence. Other race-related test score gaps may also have a genetic component. I then confront the sensitive public policy question of whether these findings should be openly acknowledged or suppressed.

Keywords: Race-IQ controversy, hereditarianism, environmentalism, fact-value distinction.

Section 1: Motivation and key concepts

1.1. Motivation for the Paper

The existence of race-related differences in average intelligence test scores, such as the gap between the average scores of self-identified Black and white Americans, is generally acknowledged[1] but the underlying causes of such gaps is a source of contention. I review multiple strands of evidence for a causal role of genetic variation associated with biogeographic ancestry in partly explaining these differences. I focus on the US Black-white intelligence test score gap; this gap is not the only observed difference in average intelligence test scores across racial groups but is the best studied. I describe multiple, mutually supportive lines of evidence indicating that this test score gap is partly caused by genetic variation between the Black and white racial groups related to their differing average proportions of African and European ancestry. I reject as implausible the widely promulgated theory that the gap is purely environmental. Other observed test score gaps, such as the white-East Asian gap, may also have partially genetic causes. I then address the sensitive question of whether public acknowledgement or suppression of these findings is best social policy. The strong, diverse evidence against the environment-only theory is now so strong that continued imposition of the theory as the only publicly acceptable one may be unviable and counterproductive.

Although evidence has been steadily accumulating for many years, public discussion of partially genetic causes of race-related test score gaps is treated as toxic, particularly within the administrative structures of government, academic, and research institutions. The dominant institutional view is that genetic explanations for test score gaps should not be explored, any positive findings supporting such explanations must be suppressed, and when questioned publicly about such findings researchers and policy analysts must state (dishonestly, in fact) that the evidence shows all root causes are due to environmental influences only. There is a widespread institutional requirement for this Platonist *noble lie* as it is termed by Winegard et al.[2] The requirement for this noble lie is often denied or expressed obliquely, but it is deeply embedded in social and institutional practices. Research grant applications and submitted research papers that are in any way critical of the environment-only theory usually get swift rejection. Academics and others who publicly cast doubt on the veracity of the environment-only theory, even if their comments are quite circumspect, are often harassed by activists and administrators and sometimes fired.[3]

Earlier papers have listed and discussed multiple lines of evidence contradicting the environment-only theory.[4] I do not repeat all the technical details covered in earlier papers; I provide an up-to-date and accessible overview, with appropriate references to the technical literature. The goal of Section 2 is to convince the open-minded reader that a large and diverse body of evidence shows that the environment-only theory is false, at least for the case of the Black-white test score gap. Section 3 discusses the implications of this evidence for the social desirability and long-term viability of the environment-only theory as the dominant paradigm. Section 4 concludes.

1.2. A caveat about frank discussion in this paper

When I described my plans to write this paper, a common response from colleagues was:

“Why bother? Everyone knows the environment-only theory is false, although few will publicly discuss it.”

This paper violates the common (but not universal) convention of public silence about genetic causes of race-related differences in cognitive ability. I honestly and openly describe the strong evidence for a partially genetic explanation of the Black-white test score gap, and the possibility of other genetics-based cognitive ability differences between socially-defined racial groups. My uncensored approach will upset many readers. Many people find it deeply offensive to publicly compare the average cognitive ability of identifiable groups and to link those average differences to genetic variation. The paper is intended only for readers who can tolerate a candid, uncensored review of the evidence. For those in need of a more uplifting story, there is an ample supply of institutional-award-winning books and papers advocating the environment-only theory.[5] Anyone who finds honest exploration of this topic distressing should stop reading this paper now.

In most areas of research, open and honest disclosure of findings is treated as a core scientific value. Cofnas and Carl offer cogent arguments in defence of open inquiry for research on the genetic causes of cognitive ability differences across racial and ethnic groups.[6] A number of authors similarly defend free inquiry for this and other politically or socially sensitive genetic-ancestry-linked research topics.[7] The institutionally dominant view is that public discussion on this topic

should be suppressed. This dominant view is motivated by understandable concerns about the social impact of potentially inflammatory research findings. There is an unstated fear that widespread public acknowledgement of such findings might substantially harm race relations, perhaps even reviving the white segregationist sentiments which were not uncommon in earlier periods of US history. Although often expressed obliquely, such fears are very strongly felt. This widespread sentiment generates enormous institutional power suppressing public discussion about empirical weaknesses in the environment-only theory.

Proponents of the dominant view are forced to walk a fine line in expressing their fears since an open call to suppress research findings is implicitly an admission of the findings' existence. Various rhetorical devices are used to propagate the noble lie without publicly espousing it. A key advantage of my candid approach is that I can compare and evaluate the costs and benefits of the noble lie without rhetorical disguises. This open approach allows me to directly address the intertwined question whether suppression of findings remains a viable and appropriate scientific policy choice. An obvious drawback of my candid approach is that it "takes sides" since talking openly about a lie is implicitly a decision to abandon the lie, at least temporarily. This temporary breach of convention is necessary to have a meaningful discussion about the noble lie's social costs and benefits, and to assess its continued viability in the face of strong evidence against it.

1.3. Definitions of self-identified race and ethnicity and of biogeographic ancestry

There are two distinct systems of categorization associated with racial identity, one socially defined and the other genetically defined. The socially defined categorization relies on the standard Self-identified Race and Ethnicity (SIRE) question which is a mainstay of social scientific research. Individuals are simply asked to describe their own race and ethnicity by choosing one or more from a list of race/ethnicity categories. In the USA, the official set of SIRE categories are defined by the Office of Management and Budget (OMB).[8] The main OMB (2017) categories are:

Hispanic or Latino ethnicity: "A person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race."

White race: "A person having origins in any of the original peoples of Europe, the Middle East, or North Africa."

Black or African American race: "A person having origins in any of the black racial groups of Africa."

American Indian or Alaska Native race: "A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment."

Asian race: "A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam."

Native Hawaiian or Other Pacific Islander race: "A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands."

SIRE choices need not be unitary: many US individuals have identities spanning multiple race or ethnicity categories, for

example, Black-white biracial, Black-Hispanic, Black-Native American, or multiracial Black-white-Native American. In some research studies, final estimation samples are restricted only to sampled individuals who choose single SIRE categories; in other studies, various weighting rules are applied to best accommodate multi-race individuals in the statistical analysis. The SIRE categories are defined by the OMB to be “social-political constructs” which “should not be interpreted as being primarily biological or genetic in reference.” OMB notes that they “may be thought of in terms of social and cultural characteristics as well as ancestry.”

The other race-related category definition has a genetic foundation. Following the completion of the human genome project in 2003, researchers discovered that they could genetically divide human populations into five super-populations or biogeographic ancestry groups (Eurasian, African, American, East Asian, and Oceanian).[9] Moreover, they could accurately determine the ancestral composition of individuals’ genomes, with respect to these groups, using statistical cluster analysis.[10] The statistical methodology to determine ancestry has advanced rapidly and now provides accurate proportional ancestry measurement at the continental level.

The two race-related category definitions are conceptually distinct, but there are some strong statistical relationships between them. In the US population, self-identified membership in OMB’s socially constructed categories is highly correlated with membership in the corresponding biogeographic ancestry groups defined genetically.[11] Only 0.14% of individuals show a clear discordance between genetic cluster membership and their self-identified race/ethnicity.[12]

The test score gaps are measured using the SIRE categories, not the biogeographic ancestry categories. The key scientific question to be confronted in this paper is whether the link between SIRE and test scores is partly due to cognition-related genetic variation, as posited by the mixed genetic/environmental theory, or whether this link is entirely non-causal as posited by the environment-only theory.

1.4. Cognitive ability test scores and their meaning

Cognitive ability has been defined as “[T] he ability to think (intelligence), knowledge (the store of true and relevant knowledge) and the intelligent use of knowledge.”[13] Cognitive ability can be measured using intelligence tests specifically designed to measure general cognitive ability, or by using academic performance tests as a proxy since these tend to correlate strongly with general cognitive ability. Cognitive tests are often sub-divided into component sub-tests that measure specific domains of intellectual ability, such as verbal fluency and mathematical ability. Individuals’ performances on these sub-tests tend to be positively correlated, that is, individuals who do well on one subtest tend to do well on the others, and vice-versa for those who do poorly. This reflects a common general intelligence factor underlying all the sub-test results. The general intelligence factor, or g-factor as it is known, can be estimated by taking a weighted average of the sub-test results, with the weights optimally adjusted for the variabilities and correlations of the sub-tests.[14] Some research papers on test score gaps use general intelligence test scores whereas others use educational performance test scores as the unit of comparison.

Like temperature scales, intelligence test scores can be rescaled by multiplying all scores by a constant and/or by adding

a constant to all of them. The two most commonly used scales are the IQ scale, in which the mean test score is set to 100 and the standard deviation is set to 15, and the standardized scale, in which the mean test score is set to zero and the standard deviation is set to 1. A gap of 1.0 on the standardized scale equates to a gap of 15 on the IQ scale.

Intelligence test scores statistically correlate with social and economic outcomes including academic achievement, career progression, employment stability, and long-term income.[15] Somewhat surprisingly given the large Black-white test score gap, the predictive power of intelligence test scores does not vary notably across Blacks and whites, so that the predictive value of a given score for educational and career achievement is not notably impacted by the racial self-identification of the individual.[16]

Section 2: Multiple lines of evidence on race-related test score gaps

This section reviews multiple lines of evidence relevant to evaluating whether observed intelligence test score differences across self-identified racial and ethnic groups can be attributed to genetic variation associated with biogeographic ancestry or whether these observed differences are entirely environmentally caused. The strands of evidence presented below vary in their strength; researchers reasonably disagree about the importance and/or strength of the various strands. Two principles of scientific inference are critical for reading the section. One: the reader must balance the totality of evidence across these diverse, multiple lines of evidence. Two: the reader must be able to decouple their political/moral concerns about racism from their objective evaluation of the evidence on purely scientific grounds. This rational decoupling does not diminish the importance of careful consideration of whether public acknowledgement of the findings could generate an increase in racism; those concerns are treated separately in Section 3.

I place a strong focus on the Black-white test score gap which is the most carefully examined cognitive ability gap across socially defined racial groups; some other race-related test score gaps are mentioned briefly.

2.1. The recalcitrant Black-white test score gap

Synopsis: The environment-only theory predicts that the Black-white test score gap can be closed by eliminating environmental impediments to Black cognitive development and learning. After sixty years of aggressive policy measures in the US to address the gap, a very substantial US Black-white test score gap stubbornly remains.

Murray provides a careful review of the evidence regarding the magnitude of the US Black-white test score gap for Americans born during the seventy-year period 1920-1991, and in a follow-up study covers additional years.[17] There was a decline in the gap on educational performance tests during the 1970s and 1980s, probably due to improved educational opportunities for the Black population born in the late 1950s and after, but no noticeable change over the subsequent thirty-year period, post-1990.

Roth et al. conduct a comprehensive meta-analysis of 105 studies, including standard general intelligence tests, academic achievement tests, mass-conscription general intelligence tests of military personnel, and private employment-based

tests.[18] The meta-analysis is restricted to studies meeting various quality control criteria and covers an aggregate sample of 6,246,729 individuals. They argue convincingly based on this wide-ranging meta-analysis that the US Black-white general intelligence test score gap has a value of approximately one standard deviation (15 IQ points). Estimates from two recent, carefully constructed cognitive development research databases reproduce this unchanged value. The Philadelphia Neurodevelopmental Cohort is a population-representative database consisting of 9,421 eight to twenty-one year olds in the Philadelphia metropolitan area, all of whom self-identified their racial and ethnic identities and took the carefully constructed Penn Computerized Neurocognitive Battery of cognitive tests. The tests were taken during the sampling period 2010-2013. The general intelligence factor scores computed from their test results give a Black-white score gap of 1.01 standard deviations.[19] The Adolescent Brain and Cognitive Development database consists of a nationally-representative sample of 10,370 nine and ten year-olds, who took the NIH Toolbox Cognitive Battery of tests in the period 2018-2021, and had their parents or guardians declare their racial and ethnic identities. The general intelligence factor test score difference between white and Black individuals in this database is 1.03 standard deviations.[20]

The stubborn secular existence of the test score gap despite half a century of ameliorative policies is matched by its geographical uniformity. Reardon et al. obtained access to over 100 million student achievement test scores from the period 2009-2013, covering virtually the entire US public school population, for a varying selection of test scores from school grades three through eight during those four years.[21] Carefully aggregating across school grades and test scoring scales, they find that the average Black-white school achievement test score difference equals 0.70 standard deviations in their comprehensive sample. Using an empirical Bayesian estimate to control measurement error, they find a positive Black-white test score gap in every single one of the 2,899 school districts in their sample; this excludes only those US school districts with inadequate data. Under the mixed environment/genetic theory with a substantial genetic component to the gap, this uniform statistical outcome across 2,899 school districts is unsurprising. It would be a remarkable outcome if the environment-only theory were true.

2.2. Cross-national comparisons of average cognitive ability

Synopsis: The environment-only theory of the Black-white gap predicts that the gap will exist in countries/regions where racial discrimination-linked disadvantages push down Black scores. The evidence indicates, on the contrary, that the gap exists worldwide.

The environment-only theory attributes the US Black-white test score gap to environmental features which are quite specific to the US, including the legacy of Black enslavement in the 18th and 19th centuries, the impacts of racial discrimination in the Jim Crow period and up to the present day, and associated dislocations in the US Black learning environment. These US-specific explanations become strained once international test score evidence is included in the analysis. The international data on test score performance shows a uniform, worldwide underperformance of all populations with predominantly African biogeographic ancestry on cognitive tests when compared to populations with predominantly European or East Asian biogeographic ancestry.

The World Bank gives harmonized national average academic achievement test scores for students in 174 countries.[22]

The scores are calibrated so that an individual student's score of 300 corresponds to minimal attainment and 625 is advanced attainment. The 36 sub-Saharan African countries in the database have an average national score of 366.3. The two Caribbean countries in the database whose populations have predominantly sub-Saharan ancestry, Jamaica and Haiti, have average national scores of 387.1 and 337.8, respectively, in the same very low range as those in sub-Saharan Africa. The 41 European countries in the database have an average national score of 486.6 and the 11 East Asian countries have an average national score of 491.0; the US national score is 511.8.

Lynn and Becker provide meta-analysis of hundreds of intelligence test studies and student achievement test scores from around the world and use them to construct average national IQ estimates.[23] They standardize all the various test scores by setting the average score within the United Kingdom equal to 100 and the standard deviation within the United Kingdom equal to 15. They provide national average IQ estimates based only on intelligence test scores, based only on student achievement test scores, and based on a weighted combination of all available test scores, both general intelligence and school achievement. Across the sub-Saharan African countries for which there is data, national average IQs using any of these three measures are very predominantly in the range 65-75.[24] They find a regional average IQ for sub-Saharan Africa of 69; the European regional average is 96 and the East Asian regional average is 104.[25] These findings have been criticized due to the extremely low average IQ scores in African nations.[26] In a careful review of the work, Warne accepts some of the criticism as valid.[27] Warne argues that the average IQ test results in undeveloped nations of Africa are not comparable to test results in developed nations due to environmental differences; nonetheless, he concludes that there is "strong evidence that [the national IQ estimates] measure something important" but they cannot be used "without reservations." The enormous gap between sub-Saharan African estimated IQs and North American/European/East Asian estimated IQs surely includes a substantial environmental component, as Warne contends, but it requires a giant leap of faith to posit that this gap is entirely rather than partially environmentally caused.

Gust et al. use statistical inference and a comprehensive micro database of international and regional achievement tests to map academic achievement of youths in 159 countries on to a common measurement scale.[28] They estimate that only 6% of youth in sub-Saharan Africa have the basic academic skills necessary to be internationally competitive in the modern global economy. This compares to 72% in Europe, 76% in North America, and 71% in East Asia and the Pacific.

At the national level, the genetic component of an underlying cognitive ability difference can create a feedback mechanism: nations where average cognitive ability is low tend to have low per-capita income and a less enriched educational environment. This feedback mechanism together with a partially genetic component to the gap can explain the extremely large academic achievement and IQ gaps between sub-Saharan Africa and North America/Europe/East Asia. A purely environmental explanation is much more difficult to justify.

2.3. Spearman's Hypothesis

Synopsis: The environment-only theory predicts that the test score gap will be larger for intelligence test questions which are more susceptible to environmental influences. Empirically, the opposite holds: the gap is larger for intelligence test questions more strongly linked to genetic influences and smaller for test questions more strongly linked to environmental

influences.

Some intelligence test questions have a stronger dependence on underlying general intelligence than others; for example, correctly recalling strings of digits (conventionally called digit span) tends to be less indicative of underlying general intelligence as measured by the g-factor than correctly recalling and reciting strings of digits in reverse order (conventionally called reverse-digit span). A question or sub-test which is closely tied to underlying general intelligence is said to have a high g-factor loading, referring to its strong link to the g-factor of general intelligence. Scores on sub-tests with high g-factor loadings tend to have higher heritability, whereas scores on subtests with low g-factor loadings tend to be more susceptible to environmental influences.

Spearman's Hypothesis, fully explicated by Jensen but named after Charles Spearman, posits that if the Black-white gap has substantial genetic causes then the relative size of the gap across intelligence sub-tests will be positively correlated with the relative g-factor loadings of the subtests. Conversely, if the gap has only environmental causes as posited by the environment-only theory then this correlation should be zero. The evidence shows that the correlation is strongly positive, indicating substantial genetic causes of the gap; there is a strong confirmation of a positive correlation across a large number of independent studies.[29] There is also some evidence of an analogous positive correlation when comparing the performance of Hispanics and whites and when comparing (opposite sign gap) East Asians and whites. This indicates that there may also be a genetic component to the (smaller) Hispanic-white test score gap[30] and the (opposite in sign) East Asian-white test score gap.[31] Warne provides a detailed discussion of empirical evidence regarding the Spearman hypothesis and its implication that the Black-white test score gap is partially genetically caused.[32]

2.4. The low power of shared environment in explaining cognitive ability

Synopsis: The environment-only theory posits that test score gaps can be explained by within-group shared environmental influences which differ across individuals with different racial identities. Given the low statistical power of shared environmental influences in explaining observed variation in cognitive ability, the implied difference between Black and white environments would need to be extraordinarily large to fully explain the magnitude of the observed US Black-white test score gap.

Jensen pointed out that the magnitude of the US Black-white test score gap, and its presence over the entire life cycle from young adolescence to retirement age, is very difficult to reconcile with established findings regarding the magnitude of shared environmental influences on test scores.[33] Using a reasonable linear approximation, the variation in cognitive ability across individuals can be statistically decomposed into three components, 1. genetic variation (inherited from parents' DNA), 2. shared environmental influences (common environmental effects across siblings raised together), and 3. non-shared environmental influences (individual-specific environmental influences which are not common within the family). The environment-only theory of a racial test score gap attributes all the test score gap to component 2, in particular to the difference in average shared environment across the two racial groups. The problem with this explanation is that in the contemporary US environment of universal public education and adequate child nutrition the magnitude of shared-environment variation in cognitive ability is very small. In this context the difference between the US Black and

white average shared environments would need to be incredibly large to account for a 15-point difference in average cognitive ability.[34]

2.5. Admixture regression with cognitive test scores

Synopsis: The environment-only theory predicts that the gap will be related to Black and white social identity and not related to African/European genetic admixture except as this admixture proxies for social identity. Admixture regression finds the opposite: the gap is strongly related to African/European genetic admixture and shows almost no statistically identifiable connection to Black/white social identity.

Admixture regression tests provide the cleanest and most robust evidence for a substantial genetic contribution to the observed Black-white test score gap. The technique involves linear regression of individuals' test scores on the same individuals' vector of biogeographic admixture proportions, such as African, European, East Asian, and Amerindian, measured using cluster analysis applied to personal DNA samples. The regression also must include race and ethnic self-identification variables such as Black, white, Asian, and Hispanic SIRE, and can include other social-based explanatory variables for cognitive ability. By including both admixture proportions and SIRE variables, admixture regression identifies the separate influences on cognitive ability of racial identity (captured by the SIRE identity variables) and genetic variation (captured by the admixture proportions determined from DNA). The environment-only theory predicts that the SIRE variables and other socially defined variables will explain score disparities and that the genetically defined admixture proportions will not; the mixed genetics/environment theory predicts that both sets of explanatory variables, including crucially the genetic admixture proportions, will have explanatory power.

The admixture regression technique relies on the biological feature that inter-ancestry mating randomly combines the genetic variants responsible for differences in cognitive ability across individuals in proportion to their ancestries. For example, if genetic variation contributes to differences in cognitive ability across African and European ancestries and inter-ancestry mating is random with respect to cognitive ability, then an individual who has 60% African and 40% European ancestry will have a 60%-40% expected weighting of the cognitive-ability related genetic variants from these two populations. This leads naturally to a simple linear relationship between individuals' vectors of ancestry proportions and their expected cognitive abilities.

Admixture regression greatly improves the ability to separate environmental and genetic causes of ethnic and racial group differences in an array of medical, anthropological, and behavioral traits. Admixture regression analysis has been used over the last two decades by genetic epidemiologists and other researchers to study race and ethnicity related differences in alcohol dependence,[35] height,[36] asthma risk,[37] cardiovascular disease,[38] sleep depth,[39] cigarette smoking behavior,[40] metabolomics,[41] cancer,[42] and diabetes.[43] With the empirical success of admixture regression in explaining ethnicity and race related differences in this wide array of medical and behavioral traits, the application of the technique to cognitive ability differences is natural and inevitable. It is "controversial" in this application only due to the political sensitivity of the findings.

Empirically, across a wide range of studies, there is a substantial and highly significant negative regression coefficient

linking cognitive ability test scores to African admixture proportions. Other ancestry admixture proportions also show some statistically significant explanatory power; East Asian ancestry often has a positive coefficient, but the evidence is less conclusive than the negative coefficient associated with African ancestry. In many studies the SIRE variables are surprisingly unimportant: their estimated coefficients are often relatively small and sometimes statistically insignificant. Multiple studies using a range of different data sources all find substantial and statistically significant negative coefficients for African ancestry explaining cognitive ability in US sample data.[44]

Fuerst explores the robustness of the finding of a negative impact of African ancestry on cognitive ability by testing the sensitivity of the result to sample selection rules and included/excluded explanatory variables.[45] Across the full set of different tests, African ancestry has a strong negative impact on cognitive ability, whereas the SIRE-linked identity variables often have a measured impact not significantly different from zero. In terms of statistical fit, Black/white identity is not a major source of the test score gap; it is mostly due to genetic variation associated with biogeographic ancestry, in particular, African versus European biogeographic ancestry.

2.6. Brain size differences across biogeographic ancestries

Synopsis: The environment-only theory does not predict any difference in average brain size linked to biogeographic ancestry. Since brain size is correlated with cognitive ability, the alternative theory of mixed genetic/environment causes fits naturally with brain size differences across ancestries. The evidence finds substantial differences, with on average larger brains among individuals with higher proportions of European versus African ancestry.

One of the early pieces of scientific evidence pointing toward a genetic component to test score gaps was the discovery of average brain size differences between individuals with African, European, and East Asian ancestry. Individuals with African ancestry have average cranial volume 6% below those with European ancestry, whereas individuals with East Asian ancestry have average cranial volume 1.3% higher.[46] Although the link between brain size and cognitive ability is not conclusive, the implication is strong. Statistical analysis shows a moderate correlation between brain size and cognitive ability.[47]

The African/European average brain size difference was first identified by pioneering American scientist Samuel Morton in the 19th century, but this scientific knowledge was institutionally "forgotten" following the 1981 publication of Stephen J. Gould's widely praised book, *The Mismeasure of Man*.[48] Gould claimed that his own re-examination of the brain size evidence showed the earlier work to be sloppy and motivated by racial prejudice. He accused Morton and other scientists who had found such differences of deliberate or clumsy errors, in part motivated by their in-built racial animosity toward non-whites.

> *"During the summer of 1971 I spent several weeks reanalyzing Morton's data….In short, and to put it bluntly, Morton's summaries are a patchwork of fudging and finagling in the clear interest of controlling a priori convictions."*[49]

Gould makes clear that Morton's purportedly "fudged and finagled" measurements were motivated by Morton's racial prejudices:

> *"Morton began his first and largest work, the* ***Crania Americana*** *of 1839, with a discourse on the essential character of human races. His statements immediately exposed his prejudices."*[50]

Gould's intimating in his book that any research showing race-related brain size differences was motivated by the researcher's racial prejudices helped discourage further inquiry.

It took the technical innovation of magnetic resonance imagery (MRI) to restore previous scientific knowledge of average brain size differences after Gould's warmly received critique. The pre-MRI measurements, which Gould had disparaged as the product of gross incompetence by scientists motivated by their racial prejudice, were shown to be accurate.[51] In defending Gould's book, Weisberg and Paul argue that Gould's extensive critique of Morton's work was not intended to give the impression that Morton's measurements were inaccurate, but only that they might be.[52]

Rushton notes that before Gould prepared the 1996 revised version of his book, newly available MRI techniques verified the pioneering measurements by Morton that Gould extensively attacks, yet Gould makes no substantive textual adjustments nor mention of this in his revision.[53] Gould's book is best understood not as a popular science book but rather as a political document designed to persuade people of the environment-only theory irrespective of scientific evidence. Although he never stated it explicitly for obvious reasons, Gould felt that perpetuation of the noble lie was more important than adhering to scientific accuracy. Viewed from this alternative perspective, the book must be acknowledged as a resounding success. The book's powerful influence on the political milieu within the academic and scientific establishment helped to slow down the pace of new findings which contradict the environment-only theory, and to prevent such findings' public dissemination.

2.7. New evidence on the recent evolution of intelligence-related genetic variation

Synopsis: Recent genomic research shows that patterns in genetic variation associated with higher intelligence increased substantially in the European population over the last ten thousand years. Parallel evolution in other regions could have similar effects after the African dispersal of humankind to multiple continents, but the impact on average intelligence of any such parallel evolution is unlikely to be exactly uniform worldwide.

Until the early years of this century, the genetic component of human cognitive ability could only be observed indirectly, by using heritability-linked sorting variables such as in twin and adoption studies. With the completion of the Human Genome Project and the subsequent genomic revolution, a new frontier has opened for the measurement of the genetic component of many human traits. Researchers have been able to create genetic-variant-based indices for human traits, including cognitive ability. These indices, called polygenic risk indices, map an individual's genotyped DNA (which is a list the individual's genetic variants) into a single number that partly captures the genetic component of the observed trait for that individual. An individual's measured value from application of the index to their genotyped DNA is called their polygenic

risk score.

Kuipers et al. estimate a dynamic statistical model of genetic variation linked to several human traits, thereby tracking the evolution of modern European ancestry from earlier genetic ancestry.[54] Their findings rely on the massive database of genotyped archaic human DNA maintained by the Reich Laboratory at Harvard University. The Reich Laboratory database provides genotyped records of recovered archaic DNA from human skeletal remains time-dated using radiocarbon techniques. Each genotyped DNA record is geolocated to its recovery site. The Reich Laboratory database has particularly strong coverage across the European continental region. Kuipers et al. are able to map 827 samples of European-area archaic DNA genotypes into a modern polygenic risk index for intelligence, and thereby calculate polygenic risk scores for intelligence for these archaic genotyped DNA samples. They repeat the procedure for 250 modern European genotyped DNA samples. Using this data they track the intelligence-related polygenic risk scores of the European population over the long period from 40 thousand years ago to modern day. They find a strong positive trend in polygenic risk scores for intelligence over the period from ten thousand years ago to modern day. Based on these findings, they note:

> *"The strong increase in social complexity resulting from the Neolithic revolution and the process of urbanization and occupational specialization are likely factors that could have driven the evolutionary advantage of improved intelligence-related scores."*[55]

Parallel evolution in other continental regions could have analogous impacts on genetic variation there, but it is implausible that any such parallel evolution would result in a completely homogenous worldwide statistical distribution of cognitive-ability-related genetic variation.

Early research comparing polygenic risk scores across continental ancestries supports the existence of cognitive ability differences tied to the evolution of genetic variation after humanity's African dispersal. The cognitive-ability-related average polygenic risk score for academic achievement of Black SIRE individuals is significantly lower than that of white SIRE individuals.[56] Piffer directly connects average polygenic score differences to biogeographic ancestries (African, European, East Asian) and shows that the observed relationship between polygenic score differences and ancestries partly explains the observed relationship between average test score differences and ancestries.[57] Lasker et al. find that twenty percent of the observed negative relationship between African ancestry and cognitive ability shown via admixture regression is explained by the lower polygenic risk scores associated with higher African ancestry.[58] All these cross-ancestry findings are not yet definitive since they are dependent to some degree upon the comparability of cross-ancestry polygenic risk scores.[59]

For the lines of evidence based on new genomic methods (this section and Section 2.5 above) a troubling new counterstrategy does not attempt to logically argue against the findings. Instead, the new counterstrategy is to block their publication and eliminate genetic data access for anyone who makes such findings public, on the grounds that the results are stigmatizing toward vulnerable minorities.[60] This enforced-ignorance counterstrategy is not logically coherent if one

simultaneously claims that the environment-only theory is true. If the theory were true, then new research findings would tend to support it rather than reject it and thereby be “de-stigmatizing” by such criteria.

Section 3: Should the Findings be Openly Acknowledged or Suppressed?

3.1. The Aggregate Implausibility of the Environment-only Theory

The multiple lines of evidence surveyed above all point toward the mixed genetic/environment theory and against the environment-only theory of the Black-white test score gap. This has been noted previously by others. Jensen and Rushton[61] and Gottfredson[62] describe the consilience of the multiple-component evidence supporting the mixed genetic/environment theory. They note that the lines of evidence on the Black-white test score gap are based on different empirical methodologies and widely diverse data sources, yet the mixed genetic/environment theory explains them seamlessly: the various empirical findings complement each other and point toward a cohesive theoretical structure. The environment-only theory, on the other hand, relies on a patchwork of explanations to counter each separate line of empirical evidence against it. Winegard et al. make a similar point and discuss how the observed findings might reflect regional variation in recent human evolutionary history.[63] Warne carefully delineates five lines of evidence and concludes that they show that the environment-only theory is false.[64] Fuerst et al. use the Adolescent Brain Cognitive Development database of genomic and test score data on ten thousand U.S. adolescents to empirically replicate and expand upon Warne’s five lines of evidence.[65]

Is it plausible for a rational and honest individual to believe the environment-only theory of the Black-white test score gap? The two modifiers “rational and honest” are critical. Emotional or spiritual beliefs need not have rational foundations and therefore a sanctified belief in the environment-only theory cannot be ruled out. Also, some commentators take a moral stance that it is best to dishonestly espouse the environment-only theory “whether or not” it is true, see, e.g., Dennett who states this explicitly.[66] The willingness to be dishonest for a good cause is usually left unstated since directly stating that one is lying reveals the lie. Also, the best way to propagate a lie is to believe it, so individuals who feel morally bound to lie about the environment-only theory are likely to internalize that dishonesty and effectively “believe it” by any observable criteria.

Advocates of the environment-only theory have offered rejoinders to all seven lines of evidence discussed above. A problem with piecemeal responses to the various lines of evidence is that even if some of the responses are at least plausible, when aggregated together the responses go from plausible to implausible. Seven diverse, extensive lines of evidence against the environment-only theory are too many for that theory to remain credible. If one is scientifically rational and honest, one is forced to acknowledge the mixed genetic/environment theory as the clearly superior theory of the Black-white test score gap. Other test score gaps may also have a genetic component.

3.2. Reasons that the environment-only theory dominates in the public arena

Measured by the volume and prominence of written commentary for and against, the environment-only theory of race-related test score gaps commands a super-majority of informed opinion, vastly overshadowing (by these criteria) the book, journal, and media output produced by the few and embattled public proponents of the mixed genetic/environment theory.

A large group of thoughtful and informed people, many of them presumably familiar with the contrary evidence, remain active proponents of the environment-only theory. It seems clear (although usually unspoken) that many scientifically informed people have personally decided that only environmental explanations should be encouraged in public discourse and that any evidence pointing toward partially genetic causes should be downplayed or suppressed completely. This is justifiable if one believes that avoiding any potential increase in racial hostility more than outweighs any costs of scientific dishonesty. Such people feel an ethical obligation to publicly espouse the theory, to deliberately obfuscate or downplay the strong evidence against it, and to block renegade research which might reveal its flaws. The relative size of this activist group is difficult to document explicitly, for obvious reasons that the noble lie cannot be openly acknowledged without damaging it.

By its very nature, publicly advocating the noble lie is logically complex. A proponent cannot state openly “everyone should suppress the evidence about the falsity of the environment-only theory in order to realize the social benefits from popular ignorance.” There is a Bertrand Russell-like paradox: a person cannot publicly espouse the noble lie without thereby undermining it; arguments must be hidden in subterfuge. Cofnas documents some of the garbled combinations of scientific half-truths intermixed with emotion-laden statements of moral principles that result when prominent thinkers attempt to shield the noble lie from criticism while denying its existence.[67]

Not all advocates of the environment-only theory support it on purely rational grounds. For many people, the environment-only theory is such a deeply cherished component of their belief system that they self-censor evidence contradicting it; the environment-only theory acts effectively as a sanctified belief rather than a scientific one.[68] These sanctified belief holders emotionally equate a strong commitment to the moral stance that “all people are created equal” to a scientific statement that “all races are identical” in terms of the statistical distribution of genetic variation as it impacts average cognitive ability conditional upon race. These two large groups, those who oppose honest disclosure of the weaknesses in the environment-only theory on ethical grounds and those who accept the theory unquestioningly as a sanctified belief, together constitute a formidable force. They shield the environment-only theory from most public criticism, protecting it as a hegemonic doctrine that it is dangerous to contradict.

Many individuals outside these two groups are privately aware of the evidence and personally oppose scientific dishonesty but cannot publicly express any misgivings for fear of personal or professional retribution. This can be a logical and morally justifiable personal strategy: renegades who openly criticize the environment-only theory can face severe consequences. Rinderman et al. surveyed the opinions of intelligence experts (anonymously) on the sources of the Black-white intelligence score gap.[69] In the survey, 49% of experts attribute the gap to 50% or more genetic causes, over 80% attribute the gap to at least 20% genetic causes. Only 16% adhere to the publicly dominant environment-only theory, assigning 0% of the Black-white test score gaps to genetic causes. An earlier poll of intelligence experts had similar

findings.[70] These polls expose a giant chasm between the private views of intelligence experts and publicly available "expert opinion" which almost never mentions the possibility of partially genetic causes of the gap. These anonymous polls make clear that many experts are aware of the evidence but choose not to speak or write about it in non-anonymous communication channels.

Genetic explanations of test score gaps are distasteful to modern sensibilities, socially uncomfortable, and may (possibly) increase racial disharmony in American society. Most people only tangentially interested in the topic find it intellectually challenging and uncomfortable to consider alternative theories and have no incentive to go against the reigning orthodoxy. For this reason and those described above, the environment-only theory reigns supreme in all major academic and research institutions.

3.3. The social desirability of the noble lie about test score gaps

Given the overwhelming predominance of the environment-only theory in the public sphere, is its position as the reigning orthodoxy secure despite the strong evidence against it? Should a false scientific theory be promoted in the interest of racial harmony? This subsection briefly considers these difficult questions.

It is impossible to reliably assess the claim that public honesty about statistical links between genetic ancestry and cognitive ability would open the floodgates to white racial supremacist political movements or revive segregationist sentiment in US society. Public honesty could have an exactly opposite effect, it might improve social harmony between races rather than worsening it: it gives the possibility of knowledge-based solutions to social discord rather than requiring ignorance-based ones. Which outcome is the more likely consequence of public openness on this topic cannot be reliably forecast.

The widespread policy of suppression and censorship, although done with good intentions, can have nasty unintended consequences. With the slow but inevitable accretion of these existing findings into broader public awareness, the proportion of the educated populace who can be convinced to honestly believe this scientifically untenable theory will continue to shrink, thereby lowering the policy's social benefits and increasing its social costs. Compared to earlier decades, the accumulation of contrary evidence is now so strong that it is no longer possible for a well-informed individual to accept the environment-only theory by giving it the benefit of the doubt: there is not enough doubt left. A well-meaning policy of information suppression can be very destructive of trust in scientific, academic, and media institutions. If the dominant strategy continues to block honest discussion, cynicism toward the research, media and policy establishment will increase as more people realize that mainstream authorities are being disingenuous. As the noble lie becomes more transparent to more people, it may dangerously erode social trust and democratic legitimacy.

Current findings on race-related test score gaps generate a clash between two very common, deeply cherished beliefs: the belief that all people in positions of responsibility should work diligently toward eliminating racial animosity in society, and the belief that open and objective scientific methods should be employed to advance human knowledge. The harsh reality of partially genetic causes of test score gaps put these two cherished beliefs in conflict. Aiding the progress of

science by openly acknowledging current findings might potentially contribute to increasing racial animosity (there is no guarantee that this would happen, but the possibility cannot be denied). On the other hand, suppressing current findings is a clear violation of the core belief that one should encourage open scientific discourse to advance human knowledge and social progress. Everyone aware of the findings is forced to choose which cherished belief matters more to them; there is no universal guidance as to which is the “correct” choice. Depending upon one’s personal preferences, background, and upbringing, a deep personal dedication to the fight against racism might override any concerns about abandoning scientific principles of openness. For others, unimpeded scientific inquiry is so central to their beliefs that it outweighs any social policy considerations. Advocates on both sides will be tempted to rationalize away any internal conflict: scientists who are devout anti-racists will convince themselves that the noble lie is actually true; individuals with a passionate devotion to the pursuit of scientific truth will convince themselves there is no risk of stirring racial animosity by being honest. Such rationalizations push the two sides further apart and, furthermore, the two opposing camps never have an opportunity to debate their differing views.

Acknowledging a lie reveals the lie, hence those in favor of the noble lie strategy do not usually publicly defend the strategy or engage in debate regarding its strengths and weaknesses. This leaves no natural mechanism for open, democratic discussion between opponents and proponents. Who gets to decide on this harshly enforced policy of dishonesty and censorship? Some method must be found to allow democratic society to openly discuss the noble lie’s costs, benefits, and net social value.

Section 4: Conclusion

The core goal of science is to help society learn true facts about the world, but some scientific findings can be extremely difficult for society to absorb. This is the case with research on the observed differences in cognitive ability across racial and ethnic groups. In the mid-twentieth century, a politically and socially appealing theory arose that all such observed differences were entirely due to the differing environmental stresses experienced by these groups and not at all to genetic variation across biogeographic ancestries such as African, European, and East Asian. Although the evidence in support of this environment-only theory was always tentative, the theory has been aggressively propounded by its many passionate advocates, with powerful backing from government, academic and research institutions. The evidence against the theory has grown stronger over time, but its public dominance has so far survived unimpeded. The penalties for publicly doubting its veracity can be extremely harsh.

This paper violates the widely imposed prohibition against questioning the environment-only theory. Seven major weaknesses are reviewed, focussing on the special case of the Black-white test score gap. Confronted by this strong, diverse evidence, the environment-only explanation of the Black-white test score gap does not retain scientific credibility. The hegemonic doctrine that the Black-white test score gap has only environmental causes endures as a socially appealing falsehood, a noble lie. Other race-related test score gaps may also have a genetic component.

Although it is no longer credible, the environment-only explanation of test score gaps continues to hold an iron grip on

acceptable public discourse. This reflects several strong influences: one, people worry that public acceptance of partially genetic explanations might provide a spur to racial discord and this leads them to deny or downplay adverse findings; two, some individuals regard the absence of genetic influences on racial test score gaps as a sacred value that cannot be questioned; three, for most people it is socially comfortable to accept the environment-only theory but uncomfortable to consider the alternative; and four, the potentially career-damaging reactions of aggressive activists keep many doubters quiet. Partially genetic explanations are broached in private conversations between trusted confidants, or via anonymous communication channels, or by renegade voices outside the circle of institutionally acceptable discourse.

There is a reasonable argument, rarely made explicitly, that fabricated confirmation of the environment-only theory serves a positive social role by aiding racial harmony. This must be balanced against the costs of public deception and the concomitant erosion of social trust. The tradeoff depends upon the credibility of the theory. The public dominance of the environment-only theory now needs a careful reevaluation considering its empirical implausibility.

Footnotes

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