Race and Intelligence

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The connection between race and intelligence has been a subject of debate in both popular science and academic research since the inception of intelligence testing in the early 20th century. There are no universally accepted definitions of either race or intelligence in academia, and any discussion of their connection involves studies from multiple disciplines, including psychology, anthropology, biology, and sociology.

The official position of the American Anthropological Association is that intelligence cannot be biologically determined by race. The American Psychological Association has said that while there are differences in average IQ between racial groups, there is no conclusive evidence for environmental explanations, there is even less empirical support for a genetic interpretation, and no adequate explanation for the racial IQ gap is presently available. According to a 1996 statement from the American Association of Physical Anthropologists, although heredity influences behavior in individuals, it does not affect the ability of a population to function in any social setting, and all peoples "possess equal biological ability to assimilate any human culture" and "racist political doctrines find no foundation in scientific knowledge concerning modern or past human populations."

Intelligence quotient (IQ) tests performed in the United States have consistently demonstrated a significant degree of variation between different racial groups, with the average score of the African American population being lower--and that of the Asian American population being higher--than that of the European-American population. At the same time, there is considerable overlap between these group scores, and individuals of each group can be found at all points on the IQ spectrum. Similar findings have been reported for related populations around the world, although these studies are generally considered less reliable due to the relative paucity of test data and the difficulties inherent in the cross-cultural comparison of intelligence test scores. While the existence of racial IQ gaps is well-documented and not subject to much dispute, there is no consensus among researchers as to their cause.

Hunt and Carlson describe four contemporary positions regarding the cause of racial IQ gaps. The first is that these gaps reflect real difference in average intelligence, which are caused by a combination of environmental factors and heritable differences in brain function. A second position is that differences in average cognitive ability between races exist and are caused entirely by social and/or environmental factors. A third position holds that differences in average cognitive ability between races do not exist, and that the differences in average test scores are the result of inappropriate use of the tests themselves. Finally, a fourth position is that there is no such thing as race, and that any comparisons between races are therefore meaningless.

History of the debate

The history of the race and intelligence controversy concerns the historical development of a

debate, primarily in the United States, concerning possible explanations of group differences in scores on intelligence tests. Historically there have been differences among average scores in IQ tests of different population groups; these have sometimes been called "racial IQ gaps". Researchers believe that environmental (socioeconomic and cultural) factors contribute to this, but have not agreed on whether the gaps are due only to environmental factors, or whether there is any genetic contribution that can be substantiated.

Claims of races having different intelligence were used to justify colonialism, slavery, social darwinism, and racial eugenics. In the late 19th and early 20th centuries, group differences in intelligence were assumed to be due to race and, apart from intelligence tests, research relied on measurements such as brain size or reaction times. The first IQ test was created between 1905 and 1908 and revised in 1916 (the Stanford-Binet Intelligence Scales). Alfred Binet, the developer of these tests, warned that these should not be used to measure innate intelligence or to label individuals. However, at the time there was great concern in the United States about the abilities and skills of recent immigrants. Different nationalities were sometimes thought to comprise different races, such as Slavs. The tests were used to evaluate draftees for World War I, and researchers found that people of southern and eastern Europe scored lower than native-born Americans. At the time, such data was used to construct a social hierarchy, in which immigrants were rejected as unfit for service and mentally defective. It was part of thinking those ethnicities were sub-standard. It was not until later that researchers realized that lower language skills by new English speakers affected their scores on the tests.

In the 1920s, some scientists reacted to eugenicist claims linking abilities and moral character to racial or genetic ancestry. Despite that, states such as Virginia enacted laws based in eugenics, such as its 1924 Racial Integrity Act, which established the one-drop rule as law. Generally, understanding grew about the contribution of environment to test-taking and results (such as having English as a second language). By the mid-1930s most US psychologists had adopted the view that environmental and cultural factors played a dominant role. In addition, psychologists were reluctant to risk being associated with the German Nazi claims of a "master race".

In 1969 Arthur Jensen revived the hereditarian point of view in the article, How Much Can We Boost IQ and School Achievement?:82 It followed changes in public programs introduced to try to correct decades of discrimination against poor African Americans. In 1954 the US Supreme Court ruled in Brown v. Board of Education that public school segregation was unconstitutional. As part of the Great Society programs under President Lyndon Johnson, the Head Start Program was started with the goal of early intervention to help socially disavantaged children succeed by providing remedial education. Given the effects of segregation and discrimination into the 1960s, many Head Start programs served African-American children.

Jensen's article questioned remedial education for African-American children; he suggested their

poor educational performance reflected an underlying genetic cause rather than lack of stimulation at home. Jensen's work, publicized by the Nobel laureate physicist William Shockley, sparked controversy amongst the academic community and student protests.

In their 1988 book The IQ Controversy, the Media, and Public Policy, Mark Snyderman and Stanley Rothman claimed to document a liberal bias in the media coverage of scientific findings regarding IQ. The book builds on the results of a survey of more than 600 psychologists, sociologists and educationalists. 45 percent of those surveyed thought that black-white differences in IQ were the product of both genetic and environmental variation, while 15 percent believed that the differences were entirely due to environmental factors; the rest either declined to answer the question, or thought that there was insufficient evidence to give an answer.

Another debate followed The Bell Curve (1994), a book by Richard Herrnstein and Charles Murray, who argued in favor of the hereditarian viewpoint. It provoked the publication of several interdisciplinary books representing the environmental point of view, as well as some in popular science. They include The Bell Curve Debate (1995), Inequality by Design: Cracking the Bell Curve Myth (1996) and a second edition of The Mismeasure of Man (1996) by Steven J. Gould. One book written from the hereditarian point of view at this time was The g Factor: The science of mental ability (1998) by Jensen. In 1994 a group of 52 scientists, including leading hereditarians, signed the statement "Mainstream Science on Intelligence". The Bell Curve also led to a 1995 report from the American Psychological Association, "Intelligence: Knowns and Unknowns", acknowledging a gap between average IQ scores of whites and blacks as well as the absence of any adequate explanation of it, either environmental or genetic.

The review article "Thirty Years of Research on Race Differences in Cognitive Ability" by Rushton and Jensen was published in 2005. The article was followed by a series of responses, some in support, some critical. Richard Nisbett, another psychologist who had also commented at the time, later included an amplified version of his critique as part of the book Intelligence and How to Get It: Why Schools and Cultures Count (2009). Rushton and Jensen in 2010 made a point-for-point reply to this and again summarized the hereditarian position.

Two public figures claimed in interviews that one of the main causes for poverty in Africa is a low average intelligence which caused great controversy. Following an interview in the monthly supplement of Helsingin Sanomat, Lynn's coauthor Tatu Vanhanen, a political scientist and father of the Prime Minister of Finland Matti Vanhanen, was investigated by the Finnish police between 2002 and 2004. In 2007 James D. Watson, Nobel laureate in biology, gave a controversial interview to the Sunday Times Magazine during a book tour in the United Kingdom. This resulted in the cancellation of a Royal Society lecture, along with other public engagements, and his suspension from his administrative position at Cold Spring Harbor Laboratory. He subsequently cancelled the tour and resigned from his position.

Many of the leading hereditarians, mostly psychologists, have received funding from the Pioneer Fund with Rushton as its current head. The Southern Poverty Law Center lists the Pioneer Fund as a hate group, citing the fund's history, its funding of race and intelligence research, and its connections with racist individuals. On the other hand, Ulrich Neisser writes that "Pioneer has sometimes sponsored useful research--research that otherwise might not have been done at all." Other sources and researches have criticized the Pioneer Fund for promoting scientific racism, eugenics and white supremacy. Similarly, Ullica Segerstråle points out that a number of critics of the hereditarian point of view have been self-admittedly motivated by a Marxist ideology, and supported by organizations such as Science for the People whose goals are political as well as scientific.

Ethics of research

The 1996 report of the APA had comments on the ethics of research on race and intelligence. Gray and Thompson (2004) as well as Hunt and Carlson (2007) have also discussed different possible ethical guidelines. Nature in 2009 invited two editorials on the ethics of research in race and intelligence by Steven Rose (against) and Stephen J. Ceci and Wendy M. Williams (for).

According to critics, research will run the risk of simply reproducing the horrendous effects of the social ideologies (such as Nazism or Social Darwinism) justified in part on claimed hereditary racial differences. Stephen Rose maintain that the history of eugenics makes this field of research difficult to reconcile with current ethical standards for science.

Linda Gottfredson argues that suggestion of higher ethical standards for research into group differences in intelligence is a double standard applied in order to undermine disliked results. Flynn, a non-hereditarian, has pointed out that had there been a ban on research on possibly poorly conceived ideas much valuable research on intelligence testing (including his own discovery of the Flynn effect) would not have occurred.

The validity of "race" and "IQ"

The concept of intelligence and the degree to which it is measurable is and has been a matter of discussion. Psychology, a psychology textbook by Schacter et al., argue that while there is a general consensus within western science about how to define intelligence, the concept of intelligence as something that can be unequivocably measured by a single figure is not universally accepted. A recurring criticism is that different societies value and promote different kinds of skills and that the concept of intelligence is therefore culturally variable and cannot be measured the same in different societies. Consequently, some critics argue, that proposed relationships to other variables are necessarily tentative.

In fields such as psychology, medicine, economics, political science, criminology, and other research on group differences, intelligence is commonly measured using intelligence quotient (IQ) tests. The statement "Mainstream Science on Intelligence" argued that "IQ is strongly related, probably more so than any other single measurable human trait, to many important educational, occupational, economic, and social outcomes ... Whatever IQ tests measure, it is of great practical and social importance". Most of the research on intelligence differences between racial groups is based on IQ testing. These tests are highly correlated with the psychometric variable g (for general intelligence factor). Other tests that are also highly correlated with g are also seen as measures of cognitive ability and have sometimes been used in the research. US examples include the Armed Forces Qualifying Test, SAT, GRE, GMAT and LSAT. International student assessment tests that have been used include the Trends in International Mathematics and Science Study, Programme for International Student Assessment, and Progress in International Reading Literacy Study. Other variables with much lower correlations such as brain size and reaction time have also been used.

Also the concept of race as a meaningful category of analysis is hotly contested. The authors of two articles in two encyclopedias, the Encyclopedia Britannica and the Encyclopedia of Race, Ethnicity and Society, argue that today the mainstream view is that race is a social construction that is not mainly based in actual biological differences but on folk ideologies that construct groups based on social disparities and superficial physical characteristics. Sternberg. et all (2005) argue that the overwhelming portion of the literature correlating race with identity has tacitly adopted folk definitions of race. The American Anthropological Association in 1998 published a "Statement on 'Race'" which rejected the existence of "races" as unambiguous, clearly demarcated, biologically distinct groups. Others argue that this view is restricted to certain fields, while in other fields, including anthropology in some other nations, race is seen as a valid biological category. This view may be adopted by biological scientists, including some biological anthropologists, who point to the fact that phenotypical characteristics often correlate strongly with other biological factors and that gene frequencies do vary among populations and can be seen to correlate with geographic, continental ancestry to a significant degree (see Lewontin's Fallacy).

Race in the studies is almost always determined using self-reports, rather than based on analyses of the genetic history of the tested individuals. According to psychologist David Rowe, self-report is the preferred method for racial classification in studies of racial differences because classification based on genetic markers alone ignore the "cultural, behavioral, sociological, psychological, and epidemiological variables" that distinguish racial groups. Hunt and Carlson write that "Nevertheless, self-identification is a surprisingly reliable guide to genetic composition. Tang et al. (2005) applied mathematical clustering techniques to sort genomic markers for over 3,600 people in the United States and Taiwan into four groups. There was almost perfect agreement between cluster assignment and individuals' self-reports of racial/ethnic identification as White, Black, East Asian, or Latino."

Group differences

US test scores

Rushton and Jensen (2005 and 2010) write that in the United States, self-identified blacks and whites have been the subjects of the greatest number of studies. They state that the black-white IQ difference is about 15 to 18 points or 1 to 1.1 standard deviations (SDs). 15% to 20% of the black IQ distribution exceeds the white median IQ, so many blacks obtain scores above the white average. The black-white IQ difference is largest on those tests that best represent the general intelligence factor g. The 1996 APA report "Intelligence: Knowns and Unknowns* and the 1994 statement "Mainstream Science on Intelligence" gave more or less similar estimates. Roth et al. (2001) in a review of the results of a total of 6,246,729 participants on other tests of cognitive ability or aptitude found a black-white gap of 1.1 SD. Consistent results were found for college and university application tests such as the Scholastic Aptitude Test (N = 2.4 million) and Graduate Record Examination (N = 2.3 million), as well as for tests of job applicants in corporate sections (N = 0.5 million) and in the military (N = 0.4 million).

A 2006 study by Dickens and Flynn estimated that the black-white gap closed by about 5 or 6 IQ points between 1972 and 2002, which would be a reduction by about one-third. However this was challenged by Rushton & Jensen who claim the gap remains stable. Murray in a 2006 study agree with Dickens and Flynn that there has been a narrowing of the gap, "Dickens' and Flynn's estimate of 3-6 IQ points from a base of about 16-18 points is a useful, though provisional, starting point". But he argues that this has stalled and that there has been no further narrowing for people born after the late 1970s. He found similar results in a 2007 study.

The IQ distributions of other racial and ethnic groups in the United States are less well-studied. The Bell Curve (1994) stated that the average IQ of African Americans was 85, Latino 89, White 103, Asian 106, and Jews 113. Asians score relatively higher on visuospatial than on verbal subtests. The few Amerindian populations that have been systematically tested, including Arctic Natives, tend to score worse on average than white populations but better on average than black populations.

According to several studies, Ashkenazi Jews score 0.75 to 1.0 standard deviation above the general European average. This corresponds to an IQ of 112-115. Other studies have found somewhat lower values. During the 20th century, they made up about 3% of the US population but won 27% of the US science Nobel Prizes and 25% of the Turing Awards. They have high verbal and mathematical scores, while their visuospatial abilities are typically somewhat lower, by about one half a standard deviation, than the European average. See also Ashkenazi intelligence.

The racial groups studied in the United States and Europe are not necessarily a random sample of the populations in other parts of the world. Therefore, results from data in the US and Europe do

not necessarily apply to the rest of the world.

International comparisons

The validity and reliability of IQ scores obtained from outside of the United States and Europe have been questioned due to the possibility of test bias as discussed in a later section. Nevertheless, some researchers have attempted to measure IQ variation in a global context. Richard Lynn and Tatu Vanhanen reviewed worldwide IQ testing and in the books IQ and the Wealth of Nations (2002) and IQ and Global Inequality (2006) estimated the average national IQs of the countries of the world. In his 2006 book Race Differences in Intelligence Lynn adopted the ten-category classification scheme of human genetic variation introduced in The History and Geography of Human Genes by Luigi Cavalli-Sforza and colleagues. Lynn argues that mean IQ varies by genetic clusters, or "race". According to his calculations, the East Asian cluster (Chinese, Japanese and Koreans) has the highest mean IQ at 105, followed by Europeans (100), Inuit-Eskimos (91), South East Asians (87), Native American Indians (87), Pacific Islanders (85), South Asians & North Africans (84), sub-Saharan Africans (67), Australian Aborigines (62), and Kalahari Bushmen & Congo Pygmies (54).

Jensen and Rushton have similarly estimated that the average IQ for East Asians centers around 106; that for Whites, about 100; and that for Blacks, about 85 in the United States and 70 in sub-Saharan Africa. Rushton, ?vorovi?b, and Bons write that several studies of IQ of Romani, a people of South Asian origin living in Europe since several centuries but with little intermarrying with other groups, show an IQ range of from 70 to 83.

Lynn also argues that IQ differences between these genetic clusters are substantially hereditary, that they have been caused by different evolutionary pressures, and that they explain much of the variation in economic and social development between nations. Lynn has defended the use of IQ data from widely divergent countries and cultures by citing evidence that IQ tests have predictive power also in regions like sub-Saharan African, and that his IQ data are highly correlated with the results of international student assessment tests such as the Trends in International Mathematics and Science Study and the Programme for International Student Assessment.

Rindermann (2007) writes regarding the national IQ data that the mixture of many different tests and the not always clear representativeness of the samples seem to be the most serious problems. Furthermore, the measurement years vary which is problematic due to the Flynn effect. Adjusting for the Flynn effect in the same manner for all nations will likely yield problematic results because since the 1970s developing nations have seen higher increases than the developed world. The method of averaging neighboring countries for an estimation for the many nations that did not have measured IQs, while having a high correlation (0.92) with the measured results in the case of the 32 nations that changed from the estimated to the measured categories between the two books, is

likely problematic since some research indicates that absence of IQ tests indicates conditions such as poverty or war that may affect IQs. International student assessment tests have fewer problems due to standardized testing of large samples within a short time interval. Weaknesses include that data from many developing nations are missing, older people are not tested, the Flynn effect has to be adjusted for, in some nations school attendance is low, and even for the same test national organizers sometimes differ in implementation and exclusion rates differ.

Lynn's methods and conclusions have been contested. Nisbett argues that an average IQ of 70 for sub-Saharan Africa is implausible since it would be lower than all but 2% of whites. Given the functioning of this group in the US this is absurd, Nisbett argues, since then the average African might not be expected to know when to plant crops, what the function of a chief is, or how to calculate kinship. Rushton and Jensen argue that such low results in whites are often due to a single gene disorder or chromosome abnormality, which also causes physical abnormalities and mechanical deficiencies effecting motor or speech skills. For sub-Saharan Africans a better comparison would be, they argue, with mental age, arguing that the average mental age of sub-Saharan Africans, compared to whites, is 13 years. Mackintosh in a review of Race Differences in Intelligence questioned Lynn's inference that Kalahari bushmen, with a claimed average measured IQ of 54, have a mental age equivalent to an average European 8-year-old; and that an 8-year-old European child would have no difficulty learning the skills required for surviving in the same desert environment. He also criticized Lynn for in some cases incorrectly or selectively reporting data from the original studies.

Wicherts and colleagues also reviewed the literature on IQ data from sub-Saharan Africa. "To arrive at a mean IQ close to Lynn and Meisenberg's estimate of 69, the majority of the data would have to be rejected... ...this would amount to the exclusion of over 25,000 cases, or two-thirds of the available data." They argue that Lynn's reasons for exclusion were biased and seem to be based on the IQ scores itself: "the exclusion rule was applied only to samples that averaged relatively high IQs, but not to samples that averaged IQs near or below 70" and "On the basis of sound methods, the average IQ remains close to 80." Furthermore, they suggest that the Flynn effect is yet to take hold in Africa. Regarding four studies comparing and finding agreement between Lynn's estimated national IQs and international student assessment tests they disagree regarding sub-Saharan Africa but write "these four studies appear to validate national IQs in other parts of the world."

There have been several other criticisms of each one of Lynn's books, as described in the articles about them, which may or may not apply more generally.

Flynn effect

Raw scores on IQ tests have been rising. This score increase is known as the "Flynn effect,"

named for James R. Flynn, who did much to document it and promote awareness of its implications. In the United States the increase has been continuous and approximately linear from the earliest years of testing to the present. For example, in the United States the average scores of blacks on some IQ tests in 1995 were the same as the scores of whites in 1945.

Potential environmental causes

The following environmental factors are some of those suggested as explaining a portion of the differences in average IQ between races. These factors are not mutually exclusive with one another, and some may in fact directly contribute to others. Furthermore, the relationship between genetics and environmental factors may be complicated. For example, the differences in socioeconomic environment for a child may be due to differences in genetic IQ for the parents, and the differences in average brain size between races could be the result of nutritional factors.

Test bias

A 1996 report by the American Psychological Association states that controlled studies show that the black-white IQ gaps are not substantially due to bias in the content or administration of the IQ tests. Furthermore, the tests are equally valid predictors of future achievement for black and white Americans. This view is reinforced by Nicholas Mackintosh in his 1998 book IQ and Human Intelligence, and by a 1999 literature review by Robert Brown et al.

Studies on other groups and in other nations have argued that IQ tests may be biased against certain groups. The validity and reliability of IQ scores obtained from outside of the United States and Europe have been questioned, in part because of the inherent difficulty of comparing IQ scores between cultures. Several researchers have argued that cultural differences limit the appropriateness of standard IQ tests in non-industrialized communities. In the mid-1970s, for example, the Soviet psychologist Alexander Luria concluded that it was impossible to devise an IQ test to assess peasant communities in Russia because taxonomy was alien to their way of reasoning.

Stereotype threat

Stereotype threat is the fear that one's behavior will confirm an existing stereotype of a group with which one identifies; this fear may in turn lead to an impairment of performance. Testing situations that highlight the fact that intelligence is being measured tend to lower the scores of individuals from racial-ethnic groups that already score lower on average. Stereotype threat conditions cause larger than expected IQ differences among groups but do not explain the gaps found in non-threatening test conditions.

A 2009 meta-analysis by Jelte Wicherts found evidence of significant publication bias in 55 studies of stereotype threat and its effect on IQ, in which those that found a strong effect were more likely to be published than those that did not. Reviewing both published and unpublished studies, Wicherts found that stereotype threat did not have an effect on all test-taking settings in which a difference in average scores is observed between races, and therefore was not an adequate explanation for the racial IQ gap.

Socioeconomic environment

According to the report of a 1996 APA task force regarding the US gaps, socioeconomic status (SES) cannot account for all of the observed racial-ethnic group differences in IQ. Their first reason for this conclusion is that the black-white test score gap is not eliminated when individuals and groups are matched on SES. Second, excluding extreme conditions, nutritional and biological factors that may vary with SES have shown little effect on IQ. Third, the relationship between IQ and SES is not simply one in which SES determines IQ, but differences in intelligence, particularly parental intelligence, also cause differences in SES, making separating the two factors difficult.

Rushton and Jensen argue that controlling for SES only reduces the black-white gap by a third or 5 points. If there are racial genetic differences, then this figure is overstated since part of the differences in parental SES are due to differences in parental IQ. Furthermore, they argue, an environment-only explanation predicts that the IQ gap would be smaller at higher levels of parental SES since these children would be less exposed to the environmental factors lowering IQ. However, the gap is actually larger at higher parental SES levels. They also point to studies finding higher average IQ for East Asians, American Indians, and Inuit with similar or worse SES than blacks. Comparing black and white children for the geographical areas of their homes, the schools they attend, and other ?ner grade socioeconomic indicators found that the black children from the best areas and schools (those producing the highest average scores) still average slightly lower on IQ than the white children with the worst socioeconomic factors.

Health and nutrition

Environmental factors including lead exposure, breast feeding, and nutrition can significantly affect cognitive development and functioning. For example, iodine deficiency causes a fall, in average, of 12 IQ points. Such impairments may sometimes be permanent, sometimes be partially or wholly compensated for by later growth. The first two years of life is the critical time for malnutrition, the consequences of which are often irreversible and include poor cognitive development, educability, and future economic productivity. The African American population of the United States is statistically more likely to be exposed to many of the possible prenatal and perinatal detrimental environmental factors.

The Copenhagen consensus in 2004 stated that lack of both iodine and iron has been implicated in impaired brain development, and this can affect enormous numbers of people: it is estimated that one-third of the total global population are affected by iodine deficiency. In developing countries, it is estimated that 40% of children aged four and under suffer from anaemia because of insufficient iron in their diets. Eppig, Fincher, and Thornhill (2009) argue that "From an energetics standpoint, a developing human will have difficulty building a brain and fighting off infectious diseases at the same time, as both are very metabolically costly tasks" and that differences in prevalence of infectious diseases (such as malaria) may be an important explanation for differences in IQ between different regions of the world; they also note that prevalence differences could have led to genetic differences.

Education

Several studies have proposed that a large part of the gap can be attributed to differences in quality of education. Racial discrimination in education has been proposed as one possible cause of differences in educational quality between races. According to a paper by Hala Elhoweris, Kagendo Mutua, Negmeldin Alsheikh and Pauline Holloway, teachers' referral decisions for students to participate in gifted and talented educational programs was influenced in part by the students' ethnicity.

The Abecedarian Early Intervention Project, an intensive early childhood education project, was also able to cause an average IQ gain of 4.4 points at age 21 in the black children who participated in it compared to controls. Arthur Jensen agreed that the Abecedarian project demonstrates that education can have a significant effect on IQ, but also said that no educational program thus far has been able to reduce the Black-White IQ gap by more than a third, and that differences in education are thus unlikely to be its only cause.

Rushton and Jensen argue that long-term follow-up of the Head Start Program found large immediate gains for blacks and whites but that these were quickly lost for the blacks although some remained for whites. They argue that also other more intensive and prolonged educational interventions have not produced lasting effects on IQ or scholastic performance. Nisbett argues that they ignore studies such as a study by Ramey and colleagues, which found that at the age 12, 87% black of infants exposed to an intervention had IQs in the normal range (above 85) compared to 56% of controls, and none of the intervention-exposed children were mildly retarded compared to 7% of controls. Other early intervention programs have shown IQ effects in the range of 4-5 points, which are sustained until at least age 8-15. Effects on academic achievement can also be substantial. Nisbett also argues that not only early age intervention can be effective, citing other successful intervention studies from infancy to college.

Logographic writing system

Complex logographic writing systems have been proposed as an explanation for the higher visuospatial IQ scores of East Asians. Critics argue that the causation may be reversed with higher visuospatial ability causing the development of pictorial symbols in writing rather than alphabetic ones. Another argument is that East Asians adopted at birth also score high on IQ tests. Similar relatively higher visuospatial abilities are also found among Inuit and American Indians whose ancestors migrated from East Asia to the Americas. Korean Hangul is not logographic.

Caste-like minorities

A large number of studies have shown that systemically disadvantaged minorities, such as the African American minority of the United States generally perform worse in the educational system and in intelligence tests than the majority groups or less disadvantaged minorities such as immigrant or "voluntary" minorities. The explanation of these findings may be that children of caste-like minorities, due to the systemic limitations of their prospects of social advancement, do not have "effort optimism", i.e. they do not have the confidence that acquiring the skills valued by majority society, such as those skills measured by IQ tests, is worthwhile. They may even deliberately reject certain behaviors seen as "acting white".

This argument is also explored in the book Inequality by Design: Cracking the Bell Curve Myth (1996) which argues that it is not lower average intelligence that leads to the lower status of racial and ethnic minorities, it is instead their lower status that leads to their lower average intelligence test scores. One example being Jews in the early 20th century in the US who, the authors argue, scored low on IQ tests. To substantiate this claim, the book presents a table comparing social status or caste position with test scores and measures of school success in several countries around the world. Examples include Koreans in Japan, Burakumin in Japan, Australian Aborigines, Romani in Czechoslovakia, Maori in New Zealand, Afrikaaners in South Africa, Catholics in North Ireland, Irish and Scottish in Great Britain, Flemish in Belgium, Arabs and Sephardi Jews in Israel, and Dalit, low caste, and tribal people in India. The authors note, however, that the comparisons made in the table do not represent the results of all relevant findings, that sometimes studies have shown more mixed findings, that the tests and procedures varied greatly from study to study, and that there is no simple way to compare the size of group differences. The statement regarding Arabs in Israel, for example, is based on a news report that, in 1992, 26% of Jewish high school, predominantly Ashkenazim, students passed their matriculation exam as opposed to 15% of Arab students. Jay Gould in the The Mismeasure of Man also argued that Jews in the early 20th century scored low on IQ tests. Rushton as well as Cochran et al. have argued that this is a misrepresentation of the studies and that also the early testing support a high average Jewish IQ.

Hereditarians reply that purely sociocultural factors like this can not explain the gap, since it has a

partial biological basis and since it's a gap in general intelligence. Murray, for example, notes that "digits-backward is much more g-loaded than digits-forward...the black-white difference in digits-backward is about twice as large as the difference in digits-forward. It is a clean example of an effect that resists cultural explanation. It cannot be explained by differential educational attainment, income, or any other socioeconomic factor. Parenting style is irrelevant. Reluctance to "act white" is irrelevant. Motivation is irrelevant."

Cultural traditions valuing education

Nisbett argues cultural traditions valuing education can explain the high results in the US for Jews (Torah study) as well as Chinese (Confucianism and the Imperial examination system).

Black subculture

Flynn has argued for importance of continued intellectual stimulation in order to sustain IQ. He writes, citing other authors, that "many black people have not signed up for the 'great mission' of the white middle class - the constant quest to stimulate intellectual growth and get their child into Harvard or Oxbridge. Rather than a 'hothouse' approach', they favour a 'natural growth' view: give a child food and love, and all will be well." There is a black teenage subculture of "Dressing sharply, sexual conquests, hanging out, drugs, hip-hop and atypical speech all crowd out more cognitively demanding pursuits."

JR Harris suggested in The Nurture Assumption that different peer group cultures may contribute to the black-white IQ gap. She cites the work of Thomas Kindermann, whose longitudinal studies find that peer groups significantly affect scholastic achievement.

Genetic arguments

Hereditarians argue that there is a substantial (50-80% in the US according to Rushton and Jensen) genetic contribution to the IQ gaps. Non-hereditarians argue that the genetic contribution to the gaps (not to individual IQ) is nil.

Evolutionary theories

There is some debate about the prior plausibility of evolved difference in intelligence. The mainstream view in evolutionary anthropology is that evolutionary explanations of group differences in intelligence are highly improbable, especially in the case of racial groups as current racial groups do not represent groups with separate evolutionary histories.For example C. Loring Brace has argued that the evolution of human intelligence is founded on the development of

human linguistic behavior and that because intelligence is of equal survival value to all humans it is implausible that any clinal distribution in the trait exists. Richard Nisbett, a cultural psychologist, on the other hand, has argued that "there are hundreds of ways a genetic difference could have arisen" and that the view that a difference could not have arisen is unfounded.

When it comes to particular mechanisms, Rushton and Lynn have argued that survival for humans, who lived in tropical and subtropical Africa for most of their evolutionary history, is harder in colder climates which caused intelligence to evolve and become higher in these climates. This argument has been rejected as unfounded speculations by evolutionary anthropologists.

Kanazawa has argued for a broader theory where evolutionary novel environments favor the development of higher intelligence. This include changed climate but also novel fauna and flora, geography, topography, and altitude. Using Lynn's IQ data, Kanazawa (2008) found support for both theories. Both lower annual temperature and environment novelty (the study uses three different measure of distance from the ancestral environment in sub-Saharan Africa: ordinary distance and differences in latitudes and longitudes) correlated with higher IQ. Wicherts et al. criticized this and several other studies for many methodological problems and argue that all the proposed causes of the Flynn effect correlate with the national IQs which provide alternative explanations.

Lynn in his book Race Differences in Intelligence: An Evolutionary Analysis argues that another factor has been higher population density increasing the number of beneficial mutations and promoting increased interactions between groups and faster spread of beneficial genes. This, he argues, explains why the Inuit, who lives in the coldest climates, do not have the highest average IQ.

Another explanation is that cultural differences in the frequency of inbreeding have affected the average genetic IQs. Cousin marriages are very common in certain cultures. Woodley (2009) reported a significant correlation of 0.62 between national IQs and percentage of consanguineous marriages. However, this effect disappeared when national GDPs/capita and education were controlled for and the effect of inbreeding on IQ have previously been shown to be relatively small. The paper argues that inbreeding differences may have an initially subtle effect that gets amplified into larger differences by feedback with factors such as nutrition and education.

A number of theories have been proposed as explanations for a higher Ashkenazi intelligence.

Rushton in his book Race, Evolution, and Behavior applied r/K selection theory to different human races. It has received numerous criticisms. For example Evolutionary biologist Joseph L. Graves argues that not only is r/K selection theory considered to be virtually useless when applied to human life history evolution, but Rushton himself does not apply the theory correctly, and displays a lack of understanding evolution in general.

Race and genetics

The decoding of the human genome has enabled scientists to search for sections of the genome that contribute to cognitive abilities, and there are also ways to study whether the differences in frequency of particular genetic variants between populations contribute to differences in average cognitive abilities. However the geneticist, Alan R. Templeton has argued that this question is muddled by the general focus on "race" rather than on populations defined by gene frequency or by geographical proximity, and by the general insistence on phrasing the question in terms of heritability of intelligence. Templeton argues that racial groups neither represent sub-species or distinct evolutionary lineages, and that therefore there is no basis for making claims about the general intelligence of races. He also argues that phrasing the question in terms of heritability is useless since heritability applies only within groups, but cannot be used to compare traits across groups. Templeton argues that the only way to design a study of the genetic contribution to intelligence is to the correlation between degree of geographic ancestry and cognitive abilities. He argues that this would require a Mendelian "common garden" design where specimens with different hybrid compositions are subjected to the same environmental influences, and he further argues that when this design has been carried out (as described below in the section Race and intelligence#Degree of geographic ancestry), it has shown no significant correlation between any cognitive and the degree of African or European ancestry.

Intelligence is both a quantitative and polygenic trait. This means that intelligence is under the influence of several genes, possibly several thousand. The effect of most individual genetic variants on intelligence is thought to be very small, well below 1% of the variance in g. Current studies using quantitative trait loci have yielded little success in the search for genes influencing intelligence. Robert Plomin is confident that QTLs responsible for the variation in IQ scores exist, but due to their small effect sizes, more powerful tools of analysis will be required to detect them. Others assert that no useful answers can be reasonably expected from such research before an understanding of the relation between DNA and human phenotypes emerges. Some researchers have expressed reluctance to investigate possible links between genes and intelligence, due to the controversy it can produce.

A 2005 literature review article on the links between race and intelligence in American Psychologist stated that no gene has been shown to be linked to intelligence, "so attempts to provide a compelling genetic link of race to intelligence are not feasible at this time". Several candidate genes have been proposed to have a relationship with intelligence. However, a review of candidate genes for intelligence published in 2009 by Deary et al. failed to find evidence of an association between these genes and general intelligence, stating "there is still almost no replicated evidence concerning the individual genes, which have variants that contribute to intelligence differences".

Heritability within and between groups

A frequently cited example of an X-factor from Richard Lewontin describes two populations of corn, one grown in a normal environment, and the other in a nutrient-deficient environment. The height of this corn is 100% heritable when grown in a uniform environment. Therefore, in such a scenario the within-group heritability of height is 100% in both populations, but the substantial differences between groups are due entirely to environmental factors. Another example is human height which is 85-90% heritable but still has increased by a standard deviation or more in a generation or less in several countries of the world.

"Heritability" is defined as the proportion of interindividual variance in a trait which is attributable to genotype within a defined population in a specific environment. A heritability of 1 indicates that variation correlates fully with genetic variation and a heritability of 0 indicates that there is no correlation between the trait and genes at all. There is broad agreement that individual variation in intelligence is neither fully genetic nor fully environmental, but there is little agreement on the relative contribution of genes and environment on individual intelligence.

It has been argued that intelligence is substantially heritable within populations, with 30-50% of variance in IQ scores in early childhood being attributable to genetic factors in analyzed US populations, increasing to 75-80% by late adolescence. High heritability does not imply that a trait is unchangeable, however, as environmental factors that affect all group members equally will not be measured by heritability (see the figure) and the heritability of a trait may also change over time in response to changes in the distribution of genes and environmental factors. High heritability also doesn't imply that all of the heritability is genetically determined, but can also be due to environmental differences that affect only a certain genetically defined group (indirect heritability).

Hereditarians have argued that there may be environmental factors ("X factors") that are not measured by the heritability figure, but such factors must have the properties of not affecting whites while at the same time affecting all blacks equally, but, the hereditarians argue, no such plausible factors have been found and other statistical tests for the presence of such an influence in the US are negative.

This argument has been criticized by other researchers using several different arguments. Firstly, as noted earlier, Templeton argues that heritability is relevant only for explaining within group variance, cannot be used to explain variation between groups. Secondly the heritability figure of .8 for White American populations have been frequently been criticized as being highly inflated. Another is arguing that there are many environmental factors, sometimes small and subtle, that together add up to a large difference between blacks and whites. Dickens and Flynn argue that the conventional interpretation ignores the role of feedback between factors, such as those with a small initial IQ advantage, genetic or environmental, seeking out more stimulating environments which will gradually greatly increase their advantage, which, as one consequence in their alternative model, would mean that the "heritability" figure is only in part due to direct effects of

genotype on IQ.

Worldwide differences

Hereditarians argue that the same group differences are repeated worldwide, both when comparing regions and when comparing the different groups in the same region, and that non-hereditarians have particular difficulty explaining the higher results for East Asians compared to whites.

Spearman's hypothesis

Spearman's hypothesis asserts that group differences on intelligence test scores are caused primarily by group differences on the general intelligence factor (abbreviated g). The general factor is a statistical construct that measures what is common to the scores of all IQ test items. How well a person does on one IQ sub-test is usually correlated with how well he or she does on other sub-tests. This is the essence of g.

Jensen developed a statistical technique known as the method of correlated vectors to test Spearman's hypothesis. The idea is that a rank ordering of IQ sub-test items by g-loadings should correlate with the magnitude of the race difference on those items, if indeed g is their cause. For example, digit span backward is more g-loaded than is digit-span forward. And, the race difference on the former is about twice as large as the race difference on the latter.

Spearman's hypothesis is not without its critics. Psychologists Hunt and Carlson write:

One of the most widely cited pieces of evidence (although not the only one) for biological differences in intelligence, sometimes referred to as Spearman's hypothesis (Jensen, 1998), rests on an indirect argument constructed from three facts. The first is that various IQ measures are substantially correlated, providing evidence for general intelligence. Although tests do vary in the extent of their g loading, factor structures are similar over several test batteries (Johnson, Bouchard, Krueger, McGue, & Gottesman, 2004). The second is that, within Whites, the g factor appears to have a substantial genetic component (see citations in Rushton & Jensen, 2005a). The third fact is that the g loadings of tests are substantially and positively correlated with the difference between the mean White and African American score on each subtest within a battery of tests. This analysis has been referred to as the "method of correlated vectors" (Jensen, 1998). Because it has also been well established that general intelligence has a substantial genetic component, results from the method of correlated vectors have been offered as putative evidence that the "default hypothesis" ought to be that about 50% of the variance in the African American versus White difference reflects genetic differences in a potential for intelligence (Jensen, 1998; Rushton and Jensen, 2005a).

They further summarize criticisms of this position:

Technical objections have been made to the method of correlated vectors and to a somewhat stronger condition: that if the within-group correlations between measures are identical across groups, the between-group differences must arise from the same cause as the within-group correlations (Widaman, 2005). The essence of these objections is that the method of correlated vectors does not consider alternative hypotheses concerning the latent traits that might give rise to the observed difference in test scores. When a more appropriate method of analysis, multigroup confirmatory factor analysis, is applied, it has been found that Spearman's hypothesis (i.e., that the difference is due to differences in general intelligence) is only one of several models that could give rise to the observed distributions in test scores (Dolan, 2000). These findings render the method of correlated vectors ambiguous--which is not the same as saying that the Jensen-Rushton position is incorrect. Our point is that the argument for the default hypothesis is an indirect one. It would be far better if a direct causal argument could be made linking racial/ethnic genetic differences to studies of the development of the brain.

Nisbett writes that the argument is based mainly on the g-loadings for the subtests of the WISC. With the exception of one subtest the differences in g-loading are very small. Furthermore, the argument is based on crystallized g. If instead looking at fluid g, then the subtests with the highest g-loading are the ones which have increased the most due to the Flynn effect. This, argues Nisbett, argues against high g-loading being due to genetics. Even if using crystazllized g, then blacks have gained almost as much on a highly crystallized g-loaded test as on IQ tests in general, which contradicts what the hereditarians would predict, that blacks would gain much less on highly g-loaded tests.

Rushton and Jensen have disputed this and argue in a response to Nisbett that a more complete analysis show consistent results for black-white differences on the Flynn effect and g-loadings supporting a genetic role.

Regression toward the mean

Jensen argues that if the average racial IQs are different, then due to regression toward the mean the average IQs of relatives to blacks and whites with the same IQ should be different. He argues that studies confirm this. Nisbett (2009) agrees that this seems to be the case but he sees this as a weak argument since this effect would also be expected from environmental factors depressing average black IQ more than average white IQ. Rushton and Jensen have replied that the results are seen for siblings who should have a very similar environment, that relatives of those scoring low regress upwards, and that, when looking at the magnitude of regression, the results are as predicted by a partial genetic hypothesis. Rushton agrees that these results could also be explained without a genetic contribution, but he argues that such an explanation would be

contrived.

Gradual gap appearance

Fryer and Levitt (2006) found in test of children aged eight to twelve months only minor differences (0.06 SD) between blacks and whites that disappeared with the inclusion of a limited set of controls including social-economic status. Flynn has argued that the U.S. black-white gap appear gradually which suggests environmental causes. "At just 10 months old, the average score is only one point behind; by the age of 4, it is 4.6 points behind, and by the age of 24, the gap is 16.6 points. This could be due to genes, but the steady rate after the age of 4 (about 0.6 IQ points lost every year) suggests otherwise, since genetically driven differences such as height differences between males and females tend to kick in at a certain age."

Rushton and Jensen argue that the black-white IQ difference of one standard deviation is present at the age of 3 and does not change significantly afterward. Murray, also a hereditarian, argues that the heritability of IQ increases with age which is reflected in the racial IQ gaps gradually increasing.

Uniform rearing conditions

Several studies have been done on the effect of similar rearing conditions on children from different races.

The Minnesota Transracial Adoption Study (1976) examined the IQ test scores of for 122 adopted children and 143 nonadopted children reared by advantaged white families. Nisbett has criticized the study for a number of weaknesses that are acknowledged by the authors. Rushton and Jensen have criticized this and argued for the significance of this study.

3 other studies found opposing evidence with none finding higher intelligence in white children than in black children. Rushton and Jensen have criticized some of them for being small and all of them for, unlike the Minnesota Transracial Adoption Study, not measuring IQ after puberty since, they argued, the importance of the family environment is shown to decline with age. Nisbett has argued that there is significant heritability at age seven which makes the absence of differences quite telling.

Moore (1986) compared black and mixed-race children adopted by either black or white middle-class families in the US. There was no difference in IQ between black and mixed-race children, whether raised by black or white families. Moore also observed that 23 black and interracial children raised by white parents had a significantly higher mean score than 23 age-matched children raised by black parents (117 vs 104), and argued that differences in early socialization

explained these differences.

Eyferth (1961) studied the out-of-wedlock children of black and white soldiers stationed in Germany after World War 2 and then raised by white German mothers and found no significant differences. The study was criticized by Rushton and Jensen for 20-25% of the "blacks" being North Africans and that the African Americans were an elite group because the Army General Classification Test excluded 30% of African Americans tested compared to 3% of whites. Nisbett writes that Flynn has argued that the army testing could not have produced more than a 3 IQ point advantage for the African Americans soldiers compared to the general African Americans population and that the North Africans would change the results only by a small amount.

Tizard et al. (1972) studied black (African and West Indian), white, and mixed-race children raised in British long-stay residential nurseries. Three out of four tests found no significant differences. One test found higher scores for non-whites.

Degree of geographic ancestry

Many people have an ancestry from different geographic regions. For example, African Americans typically have ancestors from both Africa and Europe, with, on average, 20% of their genome inherited from European ancestors. A hereditarian model predicts that blacks with a higher degree of European ancestry should on average have higher IQ.

Dickens and Nisbett have argued that the studies on the degree of geographic ancestry, as well as those on uniform rearing conditions, are the most important "direct" evidence available and overall are evidence against the hereditarians who therefore, they claim, have turned to "indirect" evidence such as brain size. Rushton and Jensen argue that these summaries exclude several recent opposing studies and that the studies cited are very old, with a range from 1934 to 1986, and are weak, undecisive, and not replicated.

Studies using variables such as skin color or blood groups in order to estimate ancestry were performed without the use of modern DNA-based ancestry estimations. Rowe & Rodgers (2005) and others have suggested using DNA-based methods to reproduce these studies with reliable estimates of ancestry. Such experiments have never been published, although the requirements for such a study have been discussed in the academic literature.

Human skin color is an indirect measure of degree of geographic ancestry. Nisbett writes that the correlation between US skin color and IQ are very weak, typically in the range of 0.1-0.15. The correlations between facial features rated as stereotypically African and IQ are similarly low in a 1966 study. Nibett argues that even if one ignores the possible advantages a whiter skin color may give this is inconsistent with a strong genetic influence. Skin color can be measured reliably. On the other hand, many of the studies are small and with dubious methodology. A major problem is

that skin color varies substantially in sub-Saharan populations even without influence of European genes. Jensen (1973) has argued that skin color does not correlate perfectly with the degree geographic ancestry and that therefore, assuming that the hereditarian theory is right, the highest skin color correlation that could be expected in the US is 0.2. Lynn in a 2002 study finds a correlation of 0.17 in the US.

Templer and Arikawa writes that Lynn's national IQ data are highly correlated (0.92) with variation in skin color and winter and summer temperatures globally, providing, in their estimation, evidence for Lynn's evolutionary hypothesis of intelligence differences. The correlation between IQ and skin color remained when calculated separately within each of three continents: Africa 0.86; Asia 0.55; Europe 0.63.

A study from 1934 and 1936 of Chicago black schoolchildren with high IQ examined their self-reported family history and found that they had slightly less white ancestry than the black national average at that time. According to Mackenzie (1984) the study invalidly used for comparison an unrepresentative national sample highly selected for scholastic achievement or SES. Also, in a later study Chicago blacks had less white ancestry than the national average.

The frequency of different blood types vary with race. Correlations between degree of European blood types and IQ have varied between 0.05 and -0.38 in two studies from 1973 and 1977. Nisbett writes that one problem is that white blood genes are very weakly, if at all, associated with one another, and therefore they may not be associated with white IQ genes. Reed, an expert on blood groups, argues that given the methodology used, these studies were unable to detect any difference.

A 1974 study by Willerman et al. found that four years old children of black fathers and white mothers had an 9 IQ point advantage over children of whites fathers and black mothers. Nisbett argues that this demonstrates the importance of environmental factors. Rushton and Jensen argue that the white mothers had almost one more year of schooling and therefore likely higher IQ, that heritability is low at this age and a follow-up is needed, and that the average IQ for the mixed-race children was intermediate to that of black (91) and white (105) children in the study.

Rowe (2002) found that mixed-race adolescents (mean age 16) from the National Longitudinal Study of Adolescent Health had intermediate verbal IQ between blacks and whites. Adjusting for social class did not affect the results. Rowe argued against discrimination based on skin tone as an explanation since only those judged by the interviewers to be black in physical appearance had been included.

Rushton (2008) in a study of South African university students, found that the IQ of Coloured, a mixed-race group, was between that of blacks and whites.

Brain size

In a study of the head growth of 633 term-born children, it was shown that prenatal growth and growth during infancy were associated with subsequent IQ. The study's conclusion was that the brain volume a child achieves by the age of 1 year helps determine later intelligence. Within human populations, Magnetic Resonance Imaging (MRI) studies conducted to determine whether there is a relationship between brain size and a number of cognitive measures have "yielded inconsistent findings with correlations from 0 to 0.6, with most correlations 0.3 or 0.4.". For postmortem studies the correlation is about 0.15. A study on twins showed that frontal gray matter volume also was correlated with g and highly heritable. A related MRI study has reported that the correlation between brain size (reported to have a heritability of 0.85) and g is 0.4, and that correlation is mediated entirely by genetic factors.

Several studies have reported that races overlap significantly in brain size but differ in average brain size. The magnitude of these differences varies depending on the particular study and the methods used. In general, these studies have reported that East Asians have on average a larger brain size than whites who have on average a larger brain size than blacks. Other researchers have also found variation in average brain size between human groups, but concluded that this variation should be viewed as being based on biogeographic ancestry and independently of "race".

Proponents of both the environmental and hereditarian perspective believe that this variation is relevant to the racial IQ gap, although they disagree as to its cause. Ulric Neisser, The Chair of the APA's Task Force on intelligence, acknowledges the brain size difference, but points out that brain size is known to be influenced by environmental factors such as nutrition, and that this fact has been demonstrated experimentally in rats. He thus believes that data on brain size cannot be considered strong evidence for a genetic component to the IQ difference. Rushton and Jensen disagree, citing several studies of malnourished East Asians showing that they have larger brains than whites, and studies demonstrating the brain size difference at birth and prenatally just a few weeks after conception. They argue that correcting for brain size between blacks and whites does not eliminate the IQ gap, which means that factors other than brain size contribute to intelligence differences; however, matching blacks and whites for IQ eliminates the difference in average brain size, suggesting that brain size is still a contributing factor.

According to an analysis by Jelte Wicherts, the material cited by Rushton is in the form of external or postmortem cranial measurements with none using more modern MRI techniques. Such material only have a correlation of 0.2 with IQ. Furthermore, even using Rushton's data the black-white difference in brain size are small (0.6 SD units) compared to the IQ differences. Wicherts also writes that there is no reason to suppose that brain size is environmentally insensitive. Even if race differences in brain size are assumed to be entirely genetic in origin, they still leave 91-95% of racial IQ gap unaccounted for, the lower number assuming that MRI would show the same results

as Rushton's data collection. Rushton argues that a 1994 MRI study in the UK on Africans and West Indians compared to Caucasians support his view although he acknowledges that the study provided no details on how, or if, the samples had been matched for age, sex, or body size.

Mental chronometry

Mental chronometry is an area of research which measures the elapsed time between the presentation of a sensory stimulus and the subsequent behavioral response by the participant. This time is known as reaction time (RT), and is considered a measure of the speed and efficiency with which the brain processes information. Scores on most types of RT tasks tend to correlate with scores on standard IQ tests as well as with g, and no relationship has been found between RT and any other psychometric factors independent of g. The strength of the correlation with IQ varies from one RT test to another, but Hans Eysenck gives 0.40 as a typical correlation under favorable conditions. According to Jensen individual differences in RT have a substantial genetic component, and heritability is higher for performance on tests that correlate more strongly with IQ. Nisbett argues that some studies have found correlations closer to 0.2, and that the correlation is not always found.

Several studies have found differences between races in average reaction times. These studies have generally found that reaction times among black, Asian and white children follow the same pattern as IQ scores. A 2007 study found Statistical mediation between reaction time tests and a traditional IQ test, in that controlling for race differences on the RT tasks resulted in the race difference on the IQ test no longer being significant. Jensen has argued that since the black-white difference in RT tasks has a rank-order correlation with the tasks' g-loadings, this is evidence for the validity of Spearman's hypothesis.

Rushton and Jensen have argued that reaction time is independent of culture and that the existence of race differences in average reaction time is evidence that the cause of racial IQ gaps is partially genetic instead of entirely cultural. Responding to this argument in Intelligence and How to Get It, Nisbett has pointed to a 1993 study by Jensen and Whang in which a group of Chinese Americans had longer reaction times than a group of European Americans, despite having higher IQs. Nisbett also mentions a pair of studies by Flynn and Deary suggesting that movement time (the measure of how long it takes a person to move a finger after making the decision to do so) correlates with IQ just as strongly as reaction time does, and that average movement time is faster for blacks than for whites. In a 2010 review of Nisbett's book, Rushton and Jensen argue that Nisbett has underestimated the strength of reaction time's correlation with IQ, and the degree to which differences in reaction time are due to g.

Significance of group differences

A significant part of the debate following The Bell Curve concerned the significance of the group differences in IQ for the future achievements of the groups in the US. The book argued for the importance of IQ for factors such as future educational achievements, employment, income, divorce rates, and crime. The book's critics argued that it overstated the importance of IQ.

Earl Hunt discusses the relationship between cognitive ability, job performance and income in his 2011 book Human Intelligence. According to Hunt, cognitive test scores have a predictive validity of 0.3 to 0.6 for job performance, and also influence income. Hunt states that racial gaps exist in job performance and income, and that the gaps in job performance are about what would be predicted based on the correlation between cognitive test scores and performance. However, he also mentions that according to a 1997 study, the variation in income associated with test scores is less than the authors of The Bell Curve claimed it was.

Lynn in the 2008 book The Global Bell Curve, aiming to build on The Bell Curve, argues that group differences in IQ are an important explanation for different achievements for different groups worldwide. One example being that when East Asians arrived in Latin America as indentured plantation workers as replacement for slaves, their descendents quickly became elite groups. Lynn argues that also environmental explanations are important, as well as non-IQ genetic group differences, such as average genetic group differences on personality variables.

The mainstream explanations of social scientists and historians for international inequality, including the North-South divide, is as the result of historical and political factors such as the heritage of colonialism including conflicts and violence, discrimination, economic exploitation by developed nations, and cultural factors such as work ethics, corruption, and human capital theories where groups receive different education.

Policy relevance

Jensen and Rushton argue that the existence of biological group differences does not rule out, but removes part of the justification for, policies such as affirmative action or redistribution in favor of the less successful group. They also argue for the importance of teaching not to stereotype from average differences since also in a group with a lower average some individuals will be above the average of other groups. Rushton, writing on the North African/South Asian average IQ, has argued that "Immigration policy too, must be adjusted. Mass immigration from the region is very likely to lower the average IQ of the receiving Western countries, and consequently be dysfunctional."

The environmentalist viewpoint argues for increased interventions in order to close the gaps. Nisbett argues that schools can be greatly improved and that many interventions at every age level are possible. Flynn, arguing for the importance of the black subculture, write that "America will

have to address all the aspects of black experience that are disadvantageous, beginning with the regeneration of inner city neighbourhoods and their schools. A resident police office and teacher in every apartment block would be a good start." Researchers from both sides agree that interventions should be better researched.

Especially in developing nations society has been urged to take on the prevention of cognitive impairment in children as of the highest priority. Possible preventable causes include malnutrition, infectious diseases such as meningitis, parasites, and cerebral malaria, in utero drug and alcohol exposure, newborn asphyxia, low birth weight, head injuries, and endocrine disorders.

Gregory Stock argues that modern biotechnology will allow parents to select desired genes in their children meaning "current debates about whether some of the differences among ethnic and racial groups are cultural or biological will soon become irrelevant, given the coming " He writes that such technology may allow parents to select intelligence or racially identifying traits (such as human skin color; see gene SLC24A5).