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Public Policy. Westport, CT: Praeger, 1997. Pp. 119-140.

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Why *The Bell Curve* Didn't Go Far Enough on Race

J. PHILIPPE RUSHTON

INTRODUCTION

My main purpose in this chapter is to suggest that public policy analysts need to rethink their attitudes to race differences and to acknowledge the international distribution and genetic basis thereof. As opportunities become equalized, racial differences in success and failure become more salient. With increasing movement towards the Global Village, the racial gradient in intelligence and success from East Asians to Europeans to Africans will be amplified on the world stage. Because racial differences are a result of evolution, they cannot be expected to disappear.

I place my chapter in the context of the furor over *The Bell Curve* and make the following points: (1) The distribution of racial differences in I.Q. found within the United States of America parallels those found internationally; (2) I.Q. scores are related to brain size, and brain size shows parallel distributions to I.Q. scores both within the United States of America and internationally; (3) Heritabilities are as generalizable across groups as are environmentalities; (4) Tests high in heritability predict racial differences better than do tests low in heritability; (5) When black heritabilities are lower than they are for whites, they suggest effects of environmental deprivation; (6) Transracial adoption studies indicate that East Asian adoptees grow to score higher than their adoptive national norms on I.Q. tests but black adoptees do not; (7) Regression to the

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mean is greater for black children of high I.Q. parents and siblings than it is for white children of high I.Q. parents and siblings; (8) The environmental variables influencing behavior are primarily those that occur within families rather than between families, implying that the variables typically proposed to explain racial differences do not do so; (9) Numerous other variables show the same racial pattern as do I.Q. scores and brain size, with Europeans averaging in the range intermediate to Asians and Africans; (10) The multifarious racial pattern is more consistent with gene-based evolutionary theory than it is with environmental theory.

THE BELL CURVE

On October 16, 1994, Malcolm Browne, science writer at the *New York Times*, reviewed three books addressing the issue of race, genetics, and I.Q.: my own *Race, Evolution, and Behavior* (Rushton 1995), Seymour Itzkoff's (1994) *The Decline of Intelligence in America*, and Richard Herrnstein's and Charles Murray's (1994) *The Bell Curve*. Browne concluded that "the government or society that persists in sweeping their subject matter under the rug will do so at its peril." Unfortunately, in the main, sweeping the topic under the rug is exactly what has been attempted. Or, as noted by Murray in his Afterword to the 1996 softcover edition of *The Bell Curve*, the attempt has been made to "put the genie back in the bottle."

To be sure, a torrent of discussion over the causes of social stratification in America did occur, albeit mostly in the form of denunciation. *The Bell Curve* was a cover story in *Newsweek, The New Republic*, and the aforementioned *New York Times Book Review*, and it soon made it to the *New York Times Bestsellers' List* (for 14 weeks!). Several anthologies of commentary appeared, also featuring my work as well as that of Richard Lynn, Arthur Jensen and other hereditarians. These included *The Bell Curve Wars* by S. Fraser (1995), *The Bell Curve Debate* by R. Jacoby and N. Glauberman (1995), and a special *Bell Curve* section in the February 1996 issue of *Current Anthropology*.

Some critics suggested the book had the impact it did because of the high placement of the authors at Harvard University and the American Enterprise Institute, and because the book's sponsors had political savvy in orchestrating public relations. (Sadly, Richard Herrnstein died of cancer on September 13, 1994, just before the book's release). These advantages may have been necessary, perhaps, but they were hardly sufficient. The more correct attribution for the success and notoriety of *The Bell Curve* is the carefully crafted exposition of its thesis, the power of its predictions, and the need of American social scientists for better explanations of the phenomena they study.

The Bell Curve reported the results of a twelve-year longitudinal study of 11,878 youths (3,022 of whom were African-American). Most seventeen-year-olds with high scores on the Armed Forces Qualification Test (blacks as well as whites) went on to occupational success by their late twenties and early thirties, whereas many of those with low scores went on to welfare dependency. These empirical relationships had been known for a long time by those of us who are both familiar with the technical literature and interested in individual differences (e.g., Hunter and Hunter 1984). But in the world of policy makers and pundits, *The Bell Curve* was a blockbuster, potentially altering the way they viewed the world. *The Bell Curve* seemed to confirm a genetic model of social stratification and, as such, improved on exclusively sociocultural and socioeconomic models.

Almost all commentators have accepted that the bell curve for African-Americans is offset lower than that for Latino-, white-, Asian-, and Jewish-Americans (in *The Bell Curve* these I.Q. equivalents were 85, 89, 103, 106, and 115, respectively). The flashpoint of discussion, however, has been the question of whether the black-white difference is partly genetic. *The Bell Curve* presented a clear rendition of the usual syllogism, that (a) I.Q. test scores are heritable in both black and white populations, (b) white I.Q.s are higher than black I.Q.s, so (c) the black-white I.Q. difference is partly heritable. This syllogism, plus other findings like the black-white I.Q. difference being related to a test's heritability and to its loading on the general factor, or psychometric *g*, led a plurality of experts in behavioral genetics and psychometrics to give their opinion that part of the black-white difference *was* genetic in origin (Snyderman and Rothman 1987, 1988). Herrnstein and Murray's book represented the mainstream view among I.Q. researchers.

In my own opinion, and despite the fact that most criticism centered on its alleged hereditarian bias, *The Bell Curve* did not go nearly far enough in explaining the genetic basis of the racial differences. Equivocation is displayed even on whether "races" exist, and the position taken is unnecessarily vulnerable to environmentalist attack. I have specified my criticisms in detail, citing chapter and verse from *The Bell Curve* where I believe it inappropriately soft-pedalled the data (Rushton 1996). It is gratifying to note that in Murray's (1996) Afterword to the paperback edition, he accepted that he and Herrnstein had understated the heritability issue. Citing *Race, Evolution, and Behavior* for the evidence *The Bell Curve* omitted, Murray drew attention to the low I.Q. scores of Africans south of the Sahara and to the significant and substantial relationship that exists between brain size and measured intelligence and the differential distribution of brain size across races.

In this chapter, I review again evidence that shows that *The Bell Curve* ignored much of the data regarding racial differences in I.Q. and other important variables. Based on my book *Race, Evolution, and Behavior*

(1995), I describe three distinct racial profiles ranging over sixty anatomical and social variables—including brain size, personality, speed of maturation, crime, family structure, and sexual behavior (see Table 5.1). The racial matrix found within the United States—with East Asians at one end of the continuum, Africans at the other, and Europeans intermediate—is found in other multiracial countries like Britain, Brazil, and Canada, and is internationally generalizable. I conclude that if all people were treated the same most race differences would *not* disappear.

UNIVERSALITY OF I.Q. DIFFERENCES

The international I.Q. gradient runs from East Asians to Europeans to Africans (Lynn 1982, 1991, 1995). The evidence on racial differences in intelligence is set out in Table 5.2. This evidence consists of the results of intelligence tests administered to various racial groups in different parts of the world.

The figures given in Table 5.2 are median I.Q.s derived from a number of studies. The races are designated in the anthropological terminology of Mongoloids (Oriental peoples—largely Chinese, Japanese, and Koreans from Northeast Asia), Caucasoids (Europeans), and so forth. The I.Q.s are calculated in relation to a mean of 100 for American Caucasoids (whites) and a standard deviation of 15. Shown are the median I.Q.s of the three numerically major races of Mongoloids, Caucasoids, and Negroids (103, 100, and 75, respectively). Negroids in the United States and Britain are entered separately because they are considered hybrids, with about 25 percent Caucasoid genes in the case of American blacks (Chakraborty et al. 1992); their average I.Q.s (84 to 87) are midway between the two parent races. American Indians and Southeast Asians—who include Australian aboriginees, New Zealand Maoris, and South Sea Islanders (Polynesians, Melanesians, etc.)—obtain median I.Q.s of 89 and 90, respectively.

There can be no real dispute about these figures, which are public and objective data. The problem lies in their interpretation, whether they are partly genetic as well as environmental. Kamin (1995) dismissed Lynn's reporting of such a low I.Q. for blacks on the African continent as constituting a "scandalous disregard for scientific objectivity." Subsequent studies, however, have supported Lynn's (1991) low estimate for African I.Q. (e.g., Lynn 1994; Owen 1992; Zindi 1994), and Murray has replied to Kamin that "When data are as carefully collected and analyzed as these, attention must be paid" (1995, 22).

Speed of decision making (reaction time) in nine- to twelve-year-olds shows the same three-way racial pattern as do test scores. Children were asked to decide which of several lights stands out from others and move a hand to press a button. All children can perform the task in less than

Table 5.1
Relative Ranking of Races on Diverse Variables

Variable	Orientals	Whites	Blacks
Brain size			
Autopsy data (cm^3 equivalents)	1,351	1,356	1,223
Endocranial volume (cm^3)	1,415	1,362	1,268
External head measures (cm^3)	1,356	1,329	1,294
Cortical neurons (billions)	13.767	13.665	13.185
Intelligence			
IQ test scores	106	100	85
Decision times	Faster	Intermediate	Slower
Cultural achievements	Higher	Higher	Lower
Maturation rate			
Gestation time	?	Intermediate	Earlier
Skeletal development	Later	Intermediate	Earlier
Motor development	Later	Intermediate	Earlier
Dental development	Later	Intermediate	Earlier
Age of first intercourse	Later	Intermediate	Earlier
Age of first pregnancy	Later	Intermediate	Earlier
Life-span	Longer	Intermediate	Shorter
Personality			
Activity	Lower	Intermediate	Higher
Aggressiveness	Lower	Intermediate	Higher
Cautiousness	Higher	Intermediate	Lower
Dominance	Lower	Intermediate	Higher
Impulsivity	Lower	Intermediate	Higher
Self-concept	Lower	Intermediate	Higher
Sociability	Lower	Intermediate	Higher
Social organization			
Marital stability	Higher	Intermediate	Lower
Law abidingness	Higher	Intermediate	Lower
Mental health	Higher	Intermediate	Lower
Administrative capacity	Higher	Higher	Lower
Reproductive effort			
Two-egg twinning (per 1000 births)	4	8	16
Hormone levels	Lower	Intermediate	Higher
Secondary sex characteristics	Smaller	Intermediate	Larger
Intercourse frequencies	Lower	Intermediate	Higher
Permissive attitudes	Lower	Intermediate	Higher
Sexually transmitted diseases	Lower	Intermediate	Higher

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Table 5.2
Median IQs of the Races.

Race	Location	Intelligence	Number of studies
Mongoloids	East Asia	103	23
Caucasoids	Europe	100	39
Caucasoids	United States	100	
Negroids	Africa	75	11
Caucasoid-Negroid hybrids	United States	84	169
Caucasoid-Negroid hybrids	Britain	87	3
American Indians	North America	89	15
South East Asians	South East Asia	90	5

Source: R. Lynn (1995). "Cross-Cultural Differences in Intelligence and Personality." In D. Saklofske and M. Zeidner (eds.), ***The International Handbook of Personality and Intelligence***, p. 110, Table 1. New York: Plenum. Copyright by Plenum Press. Reprinted by permission.

one second, but children with higher I.Q. scores perform faster (after controlling for movement time) than do those with lower scores. Lynn (1991) found that Asian children from Hong Kong and Japan were faster than were European children from Britain and Ireland, who in turn were faster than black children from South Africa (see also Lynn and Shigehisa 1991). Using similar tasks, this pattern of racial differences was also found in California (Jensen 1993; Jensen and Whang 1993).

BRAIN SIZE AND INTELLIGENCE

A review of the literature shows that brain size is related to cognitive ability. Rushton and Ankney (1996) examined eight studies of nonclinical adults (N = 381) that used Magnetic Resonance Imaging (MRI) to construct three-dimensional pictures of the brain *in vivo* and found that the overall correlation between brain size and I.Q. was 0.44 (e.g., Andreasen et al. 1993; Wickett, Vernon, and Lee 1994; Willerman et al. 1991). Seven MRI studies of adult clinical samples (N = 312) showed an overall correlation of 0.24. Fifteen studies using external head measurements with adults (N = 6,437) showed an overall correlation of 0.15, and seventeen studies using external head measurements with children and adolescents (N = 45,056) showed an overall correlation of 0.21. The overall probability of finding these correlations between brain size and I.Q. by chance was less than 10^{-10}.

The racial gradient in brain size parallels that in cognitive ability. East Asians average larger brains than do Europeans, who average larger brains than do Africans. The evidence was established using three independent procedures: (1) wet brain weight at autopsy, (2) volume of empty skulls using filler, and (3) volume estimated from external head sizes. The results converge on the conclusion that the brains of East Asians and their descendants average about 17 cm^3 (1 in^3) larger than those of Europeans and their descendants, whose brains average about 80 cm^3 (5 in^3) larger than those of Africans and their descendants.

Using brain mass at autopsy, Ho et al. (1980) summarized data for 1,261 adults (sexes combined). They reported for European-Americans a mean of 1,323 grams and for African-Americans a mean of 1,223 grams. Using endocranial volume, Beals, Smith, and Dodd (1984) analyzed about 20,000 skulls (sexes combined) from around the world and found that East Asians averaged 1,415 cm^3, Europeans averaged 1,362 cm^3, and Africans averaged 1,268 cm^3. Using external head measurements, a stratified random sample of 6,325 U.S. Army personnel showed that Asian-Americans, European-Americans, and African-Americans averaged 1,416, 1,380, and 1,359 cm^3, respectively (Rushton 1992). Similar cranial measures from tens of thousands of men and women aged twenty-five to forty-five from around the world collated by the International Labour Office found that Asians, Europeans, and Africans averaged 1,308, 1,297, and 1,241 cm^3, respectively (Rushton 1994). Finally, an MRI study found that people of African and Caribbean background averaged a smaller brain volume than did those of European background (Harvey et al. 1994).

Racial differences in brain size show up early in life. Data from the National Collaborative Perinatal Project on 19,000 black children and 17,000 white children showed that black children had a smaller head perimeter at birth and, although black children were born shorter in stature and lighter in weight than white children, by age seven "catch-up growth" led black children to be larger in body size than white children. However, they remained smaller in head perimeter (Broman, et al. 1987).

A functional relation between brain size and cognitive ability is implied in two studies by Arthur Jensen showing the head size/I.Q. relation *within* as well as *among* families. A tendency for a sibling with a larger head to have a higher I.Q. than a sibling with a smaller head is of special interest because it controls for many of the sources of variance that distinguish families, such as cultural background and socioeconomic status. Jensen (1994) examined 82 pairs of monozygotic and 61 pairs of dizygotic adolescent twins and extracted the general factor, or psychometric *g*, from their I.Q. tests and found it correlated with head size across individuals ($r = 0.30$)—within twin pairs ($r = 0.25$) and between twin pairs ($r = 0.32$). Jensen and Johnson (1994) examined the head size/I.Q. relation in 14,000 pairs of siblings from the National Collaborative Perinatal Project described above and found that the significant correlation existed within families ($r = 0.11$) as well as between families ($r = 0.20$).

GENERALIZING HERITABILITIES

Most reviewers agree that estimates of the heritability of I.Q. among whites range from 40 to 80 percent (Herrnstein and Murray, 1994). Similar heritabilities are also found among African-Americans, Chinese-Americans, and the Japanese in Japan (Rushton 1995). It seems as reasonable to generalize these within-group heritabilities to between-group differences as it would be to generalize within-group environmentalities to between-group differences. If poverty correlates with underachievement in New York City and Los Angeles, it would be sensible to expect similar relationships to occur in Paris and Toronto. If poor nutrition lowered I.Q. *within* whites and blacks, it would be correct to suppose that poor nutrition had an effect on differences *between* whites and blacks. Only a narrowly conceived argument would expect "environmental" relationships to generalize and "genetic" ones not to.

The correlates of achievement within the United States are, in fact, found to be generalizable for blacks, whites, Hispanics, and Asians. Using diverse data, Rowe, Vazsonyi, and Flannery (1994) found that the covariance matrices for various groups were nearly identical and as similar to each other as covariance matrices computed from random halves within the same ethnic group. Carretta and Ree (1995) found a near identity of structure of intellect for various ethnic x sex groupings in the Air Force Officer Qualifying Test (AFOQT), an aptitude battery given to 269,968 applicants. Ree and Carretta (1995) found the same result with the less specialized Armed Services Vocational Aptitude Battery (ASVAB). Clearly, average group differences result from different levels of the same processes, be they genetic or environmental. Rowe et al. (1994, 412) concluded:

> Researchers should also be encouraged: Results they obtain for one ethnic group or in one U.S. geographic location will probably generalize to other groups and locations. Powerful generalization is the hallmark of a successful scientific enterprise; it bodes well for the future success of social science that developmental processes are alike in many subgroups of *homo sapiens*.

Genetic Weights Predict Racial Differences

Finer grained heritability analyses support the genetic hypothesis over the 100 percent environmental alternative. While the black-white I.Q. gap averages fifteen points, the difference is more pronounced on tests of high heritability than it is on tests of low heritability. This is an alternative prediction. Often genetic and environmental hypotheses of race differences lead to the same predictions, so they cannot be decided between on the basis of empirical outcomes. But here a situation exists in which environmental and genetic hypotheses predict diametrically *opposite* outcomes. Environmental theory predicts that racial differences will be greater on more culturally influenced tests, whereas genetic theory predicts that racial differences will be greater on more heritable tests.

To my knowledge, Jensen (1973, ch. 4) was the first to apply the idea of differential heritability to race differences. He calculated the *environmentability* of various tests in both black and white children by the degree to which sibling correlations departed from the pure genetic expectation of 0.50. Sibling differences were inversely related to the magnitude of the black-white difference ($r = -0.70$) leading to the conclusion that the more environmentally influenced tests differentiated blacks and whites the least. Jensen (1973) also cited an unpublished replication study by Nichols (1972) using the heritability of thirteen tests derived from seven-year-old siblings, including an equal number of whites and blacks. The more heritable the test, the more it discriminated between the races ($r = 0.67$ between heritability and magnitude of the black-white difference).

Subsequently, Jensen (1985, 1987a) found the black-white I.Q. difference was related to a test's *g* loading, *g* being the general factor or first principal component which emerges when factor analysis is carried out on different ability measures. The higher a test's *g* loading, the more heritable it tends to be, the more related it is to biological factors and brain processes, and the more predictive of intelligent behavior it is. Jensen (1985, 1987a; Naglieri and Jensen 1987) examined twelve large-scale studies, each comprising anywhere from six to thirteen tests administered to over 4,000 elementary and high school students and found that the test's *g* loading consistently predicted the magnitude of the black-white difference.

Prompted by Jensen's approach, I (Rushton 1989) replicated the relationships between genetic weights and the magnitude of the black-white difference using inbreeding depression effects on eleven subtests of the Wechsler Intelligence Scale for Children-Revised (WISC-R) calculated from 1,854 cousin marriages in Japan. Inbreeding depression occurs when harmful recessive genes combine, an event more likely in offspring of closely related parents and for which there is no explanation other

Table 5.3
Subtests of the Wechsler Intelligence Scale for Children-Revised (WISC-R) Arranged in Ascending Order of Black-White Differences in the United States, with Each Subtest's *g* Loading, Inbreeding Depression Score from Japan, and Reliability

WISC-R subtest	Black-White difference (N = 4,848)	*g* loading (N = 4,848)	Inbreeding depression (N = 1,854)	Reliability (N = 2,173)
1. Coding	.45	.37	4.45	.72
2. Arithmetic	.61	.61	5.05	.77
3. Picture completion	.70	.53	5.90	.77
4. Mazes	.73	.40	5.35	.72
5. Picture arrangement	.75	.52	9.40	.73
6. Similarities	.77	.65	9.95	.81
7. Comprehension	.79	.62	6.05	.77
8. Object assembly	.79	.53	6.05	.70
9. Vocabulary	.84	.72	11.45	.86
10. Information	.86	.68	8.30	.85
11. Block design	.90	.63	5.35	.85

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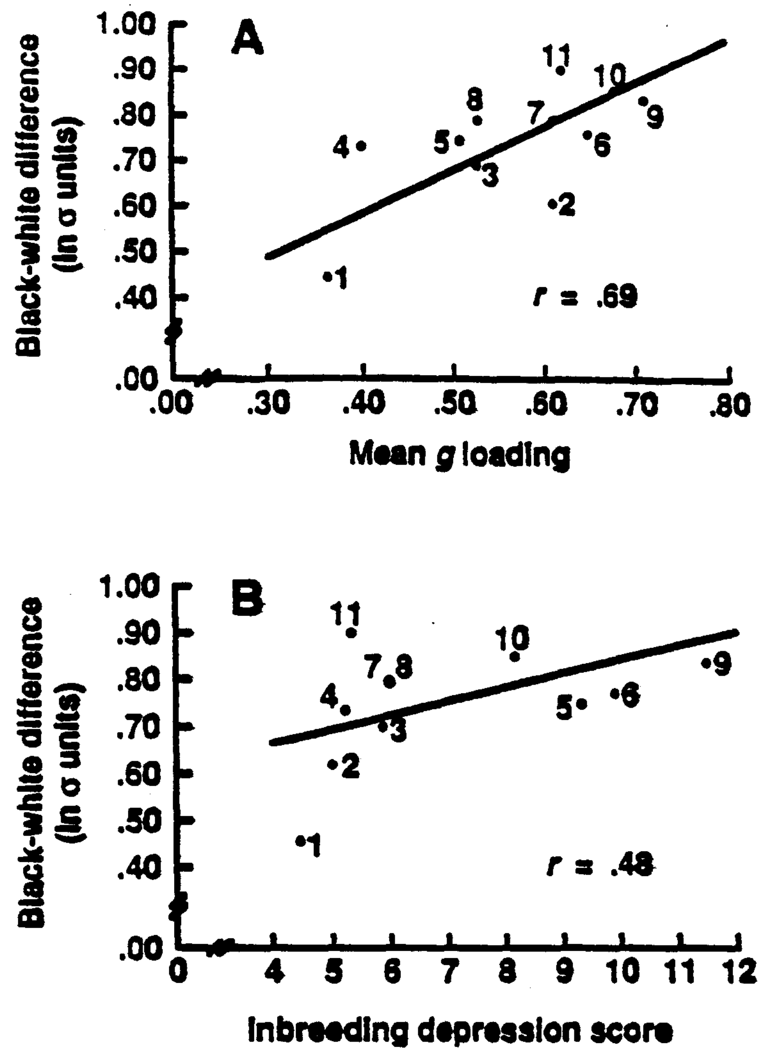
Note: Based on data from Jensen (1985, 1987a; Naglieri and Jensen 1987; Rushton 1989).

than a genetic one. What environmental factor can possibly explain how inbreeding depression scores measured among Japanese children predict black-white differences on the same tests?

Set out in Table 5.3 are the data used in the studies by Jensen (1985, 1987a) and Rushton (1989). This table provides a weighted average for the five sets of black-white differences reported by Jensen (1985, 1987a; Naglieri and Jensen 1987) (in σ units, based on raw scores from a total N = 4,848) and a weighted average for the ten sets of *g* loadings. I also provide the reliabilities of the tests, which are statistically controlled for in the analyses that follow. Figure 5.1 shows the regression of black-white differences on the *g* factor loadings and on the inbreeding depression scores. As the estimates of genetic penetrance increase, so do the magnitudes of the black-white differences. The genetic contribution to racial differences in mental ability appears robust across populations, languages, time periods, and measurement specifics.

Figure 5.1

Regression of Black-White Differences on *g* Loadings (Panel A) and on Inbreeding Depression Scores (Panel B)



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Note: The numbers indicate subtests from the Wechsler Intelligence Scale for Children-Revised: 1 Coding, 2 Arithmetic, 3 Picture completion, 4 Mazes, 5 Picture arrangement, 6 Similarities, 7 Comprehension, 8 Object assembly, 9 Vocabulary, 10 Information, 11 Block design.

Black Heritability Estimates

In a debate with Francis Galton ([1865] 1995), Charles H. Cooley ([1897] 1995), a founder and the first president of the American Sociological Association, illustrated how seeds given a normal environment grow plants of full height while seeds given a deprived environment grow plants of stunted height. This powerful analogy has been used many times in the debate over race (Block 1995; Herrnstein and Murray 1994; Lewontin 1970), in order to demonstrate indisputable environmental effects. Depending on whether the seeds are genetically identical, the analogy may also shed light on the heritability issue. In his use of the analogy, Block (1995) begged the question by insisting that the heritability of the seeds needed to be set at 100 percent to make the environmentalists' point. Block criticized Herrnstein and Murray's (1994) rendition of the seed example for begging the question in the opposite direction. By planting one set of seeds in Iowa and the other in the Mojave Desert, Block argued that Herrnstein and Murray had inappropriately set the heritability at zero, given that all the corn in the Mojave died.

Regardless, both the 100 percent and 0 percent genetic scenarios for the seeds are misleading. It is an *empirical* question whether heritabilities for blacks are the same as, or different from, those for whites. It is a truism among geneticists that as environments become less impeding and more equal, genetic contributions become larger. For example, over the last fifty years, as environmental barriers to health and educational attainment have fallen, the variance accounted for by genetic factors has increased (Scriver 1984; Heath et al. 1985). In animal studies, low heritabilities for body size variables are typically interpreted as showing a suppressant effect of the environment on natural growth (e.g. Larsson 1993).

The relevant question thus becomes: Are heritabilities for blacks lower than those for whites, as predicted by environmental deprivation hypotheses? I found some suggestion that this might be the case in a study of cranial capacity in several hundred black and white twins (Rushton and Osborne 1995). There appeared to be a higher range of heritabilities for whites than for blacks (47% to 56% *vs* 12% to 31%), and a lower range of environmentalities for whites than for blacks (44% to 53% *vs* 69% to 88%). The class of factors that included prenatal insult, illness, nutrition, and poverty seemed like it might have had a more negative effect on brain development among blacks than among whites. However, these differences did not reach statistical significance. Future research along these lines may be informative.

Transracial Adoption Studies

Studies of Korean and Vietnamese children adopted into white American and white Belgian homes have been conducted (Clark and Hanisee 1982; Frydman and Lynn 1989; Winick, Meyer, and Harris 1975). As babies, many East Asian adoptees were hospitalized for malnutrition. Nonetheless, they grew to have I.Q.s ten or more points higher than their adoptive national norms.

By contrast, black and mixed-race (black-white) children adopted into white middle-class families typically perform at a lower level than white siblings with whom they have been raised or white children adopted into similar homes. Set out in Table 5.4 are data from the well-known Minnesota Transracial Adoption Study. By age seventeen, adopted white children had an average I.Q. of 106, an aptitude based on national norms at the 59th percentile, and a class rank at the 54th percentile; adopted mixed-race children with one white and one black biological parent had an average I.Q. of 99, an aptitude at the 53rd percentile, and a class rank at the 40th percentile; and adopted black children with two black biological parents had an average I.Q. of 89, an aptitude at the 42nd percentile, and a class rank at the 36th percentile (Weinberg, Scarr, and Waldman 1992). Although these data can be interpreted in a number of ways (Waldman, Weinberg, and Scarr 1994), they seem most clearly compatible with a genetic hypothesis (Rushton 1995).

Not all transracial adoption studies find the black-white difference. *The Bell Curve* (Herrnstein and Murray 1994, 309–310) describes null findings from a German study and from the Minnesota Study at a time when the children were only seven years old (see Table 5.4). But these apparent exceptions may "prove the rule." In general, behavior genetic studies show that as people age, trait heritability increases while environmentability decreases (Plomin, DeFries, and McClearn 1990). Differences not apparent before puberty often become evident by age seventeen.

Regression to the Mean

If black and white samples are drawn from genetically different populations, then parent-child regression effects will differ such that the offspring of high-I.Q. black parents will show more regression toward a lower population mean than the offspring of high-I.Q. white parents. Similarly, the offspring of low-I.Q. black parents should show less regression than those of low-I.Q. white parents.

These regression predictions were tested by Jensen (1973, ch. 4) with data from siblings, which provide an even better test than parent-offspring comparisons because siblings share similar environments. Black and white children matched for I.Q. were found to have siblings who

Table 5.4
Comparison of Black, Mixed-Race, and White Adopted and Biological Children Raised in White Middle-Class Families

Children's background	Age 7 IQ	Age 17 IQ	Age 17 school achievement		Age 17 school aptitude based on national norms (weighted mean of 4 percentiles)
			Grade point average	Class rank	
Adopted, with 2 black biological parents	97	89	2.1	36	42
Adopted, with 1 white, 1 black biological parent	109	99	2.2	40	53
Adopted, with 2 white biological parents	112	106	2.8	54	59
Nonadopted, with 2 white biological parents	117	109	3.0	64	69

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Note: Based on data from Weinberg, Scarr, and Waldman (1992).

regressed approximately halfway to their respective population means rather than to the mean of the combined population. For example, if black and white children were matched with I.Q.s of 120, the black children's siblings averaged close to 100 and the white children's siblings averaged close to 110. A reverse effect was found with children matched at the lower end of the I.Q. scale. If black and white children were matched for I.Q.s of 70, the black children's siblings averaged about 78 and the white children's siblings averaged about 85. The regression line showed no significant departure from linearity throughout the range of I.Q. from 50 to 150. As Jensen (1973) pointed out, this amount of regression directly fits a genetic model and not an environmental one. The same effect occurs for height, or number of fingerprint ridges, or any other polygenetically inherited characteristics.

Jensen (1974) provided additional results predicted by a genetic-regression hypothesis. Black children born to upper status parents averaged two to four I.Q. points below white children born to lower status parents, despite environmental advantages accruing to the black children from being raised in an upper status home and even though the upper status black parents were of higher I.Q. than the lower status white parents. Regression to the mean explains the cross-over of average I.Q.s of children from the two racial groups.

BETWEEN-FAMILY VERSUS WITHIN-FAMILY EFFECTS

Adoption and twin designs show that the environmental variables influencing behavior are primarily those that occur within families rather than between them (Plomin and Daniels 1987; Plomin and Bergeman 1991). This is one of the more important discoveries made using behavior genetic procedures; it holds even for variables such as altruism, obesity, and law abidingness, which parents are thought to socialize heavily. It is possible to conclude from these findings, as Block (1995, 106) recently did, that whatever the environmental influences are that shape development they are "*mostly unknown at present*" (italics in the original). It is also sensible to draw the inference, however, that because the variables usually proposed to explain racial differences, such as social class, religious beliefs, cultural practices, father absence, and parenting styles, account for so little variance *within* a race, they are unlikely to account for differences *among* races.

Differences in the general factor of intelligence, *g* found between races, are primarily due to within-family effects, such as genetics, rather than "extrinsic" to the family, such as socioeconomic background. This follows because covariance structures remain constant regardless of whether they are calculated from within-family data or from between-family data. For example, *g* is constant across all three major racial groups from both within-family and between-family analyses (Jensen 1987b; Nagoshi, Phillips, and Johnson 1987). Similarly, the brain-size/I.Q. relation is a within-family as well as a between-family phenomenon, as mentioned earlier.

On the other hand, referring back to the behavior genetic study of cranial capacity (Rushton and Osborne 1995), finer grain environmental analyses find that although environmental effects common to both twins (such as parental socioeconomic status) ranged from 0 percent to 7 percent for whites, they ranged from 28 percent to 32 percent for blacks. In contrast, environmental effects unique to each twin (such as illness and trauma) were as similar for blacks as for whites (42% to 46% for whites and 38% to 59% for blacks). Thus, in this particular study, the between-family effects, the category traditionally including "racism," had more effect on black children than on white children. The clear message to be drawn is that for the information they provide, heritability studies should be embraced as much by "environmentalists" as by "hereditarians."

CHARACTER, SEXUALITY, AND TESTOSTERONE

A review of the world literature on more than sixty variables shows that the racial differences go well beyond intelligence and brain size to include reproductive behavior, speed of maturation, law abidingness, and social organization (see Table 5.1). Aggregating across a wide network of evidence provides a greater chance of finding powerful theories than does examining only single dimensions within just one country.

Consider, for example, why the racial pattern in violent crime found within the United States holds internationally. INTERPOL yearbooks for 1983–84, 1985–86, and 1989–90 show that in violent crimes per 100,000 population (homicide, rape, and serious assault), African and Caribbean countries average double the rate of European and Middle Eastern countries and three times the rate of East Asian countries (Rushton 1990). Similarly, the matrifocal family pattern found disproportionately among African-Americans is to be found in Britain, the Caribbean, and in south-of-Saharan Africa (Draper 1989). A parallel international pattern of scores shows up in studies of temperament, in children as well as adults, and in surveys of sexual behavior, including of sexually transmitted diseases. Whatever the causes of the racial differences turn out to be, clearly they go beyond American particulars.

In *The Bell Curve*, controlling for I.Q. reduced but did not eliminate black-white differences in rates of incarceration and out-of-wedlock birthing. More than I.Q. must be involved. One neurohormonal contributor to crime, temperament, and sexual behavior is testosterone. Studies (e.g., Ellis and Nyborg 1992) show 10 percent more testosterone in black college students and military veterans than in their white counterparts. East Asians show lower amounts of testosterone than whites. Linked directly to sex hormones is the rate of double ovulation, indexed by the rate of dizygotic twinning per 1,000 births. Among East Asians, the rate is less than 4, among Europeans 8, and among Africans it is 16 or greater. Multiple birthing is known to be heritable through the race of the mother regardless of the race of the father, as found in East Asian-European crosses in Hawaii and European-African crosses in Brazil (Bulmer 1970).

EVOLUTIONARY SELECTION OF RACES

Discussion of race shows little sign of diminishing despite efforts to debunk the concept. Downgrading the idea of race, however, not only conflicts with people's tendency to classify and build histories according to putative descent, but ignores the work of biologists studying other species (Mayr 1970). In his 1758 work, Linnaeus classified four subspecies of *Homo sapiens: europaeus, afer, asiaticus*, and *americanus*. Most subsequent classifications recognize at least the three major subdivisions considered in this article: Mongoloid, Caucasoid, and Negroid. This does not rule out making finer distinctions within these major races.

Those objecting to the idea of race call definitions arbitrary and subjective (Diamond 1994; Lewontin, Rose, and Kamin 1984; Yee, et al. 1993). The main empirical reasons given for negating the race concept are: (1) the degree of variance within any one race, (2) the disagreement as to exactly how many races there are, and (3) the blurring of distinctions at category edges because of admixture. For example, with respect to classification, Diamond (1994) surveyed half a dozen geographically variable traits and formed very different "races" depending on which traits he picked. Classifying people using antimalarial genes, lactose tolerance, fingerprint whorls, or skin color resulted in the Swedes of Europe being placed in the same groupings as the Xhosa and Fulani of Africa, the Ainu of Japan, or the Italians of Europe.

But many of Diamond's (1994) classifications are nonsensical because they have little, if any, predictive value beyond the initial classification. More important, they appear to be a deliberate attempt to obfuscate the scientific meaning of race, that is, a recognizable (or distinguishable) *geographic* population. In science, the validation of constructs such as race depend on a network of predictive relationships, including item, subject, and sample aggregations. As this chapter shows, the construct validity of the three major races of Mongoloid, Caucasoid, and Negroid has been established at the anatomical and behavioral level across both time and national boundaries. If race is simply arbitrary, consistent relationships of the type to be presented would not be found.

A race, it should be clear, is what taxonomists term a geographic variety or subdivision of a species characterized by a more or less distinct combination of traits (morphological, behavioral, physiological) that are heritable. Zoologists have identified two or more races in many mammalian species. Among humans the three major races of Mongoloids, Caucasoids, and Negroids can be distinguished on the basis of obvious differences in skeletal morphology, hair and facial features, and molecular genetic information. Forensic anthropologists regularly classify skeletons of decomposed victims by race. For example, narrow nasal passages and a short distance between eye sockets mark a Caucasoid, distinct cheekbones identify a Mongoloid, and nasal openings shaped like an upside-down heart typify a Negroid (Ubelaker and Scammel 1992). The race of a perpetrator of a crime is increasingly identified from blood, semen, and hair samples. To deny the predictive validity of race at this level is nonsensical.

The currently most accepted view of human origins, the "African Eve" theory, posits a beginning in Africa some 200,000 years ago, an exodus through the Middle East with an African/non-African split about 110,000 years ago, and a Caucasoid/Mongoloid split about 41,000 years ago (Stringer and Andrews, 1988). Evolutionary selection pressures are different in the hot savanna, where Negroids evolved, than in the cold Arctic, where Mongoloids evolved. I proposed (Rushton 1995) that the farther north the populations migrated "out of Africa," the more they encountered the cognitively demanding problems of gathering and storing food, acquiring shelter, making clothes, and raising children successfully during prolonged winters. As these populations evolved into present-day Caucasoids and Mongoloids, they did so in the direction of larger brains, slower rates of maturation, and lower levels of sex hormone—with concomitant reductions in sexual potency, aggressiveness and impulsivity, and increases in family stability, advance planning, self-control, rule following, and longevity.

I must conclude, therefore, that no reasonable doubt remains for the genetic hypothesis for at least some of the pattern of racial differences. I am aware of no environmental factor able to explain either the consistency of the international racial pattern across so many diverse variables or the tradeoff between brain size and gamete production in which people of East Asian ancestry average the largest brains and the lowest twinning rate, people of African ancestry average the smallest brains and the highest twinning rate, and people of European ancestry average intermediately in both. Only gene-based life-history theories predicting tradeoffs between parental care and reproductive effort fit all of the data.

POLITICAL CONCLUSION

Evolutionary selection explains the how and why of the worldwide racial clustering. Recognizing that the pattern in achievement, crime, and family organization is not unique to the United States but occurs internationally shows the need for a more general (genetic-evolutionary) theory than the highly localized explanations typically provided. Traditional environmental explanations based on Asian family strength and African poverty are themselves explained by an evolutionary perspective.

Although I believe that policy makers need to become alert to the new data, I nonetheless hold that if, after all, genes are found to contribute to a variety of race differences, no necessary policy implications follow. As I stated in ***Race, Evolution, and Behavior*** (Rushton 1995, 256–257):

> Some have claimed that human sociobiology is not a science and exists only to justify existing social inequalities. . . . At the extreme, sociobiological work, especially on race, is associated with the Nazis. . . . The underlying logic of these political critiques is grievously flawed. . . . There are no necessary policies that flow from race research. The findings are compatible with a wide range of recommendations: from social segregation, through laissez-faire, to programs for the disadvantaged.

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