Review of: J.P. Rushton, *Race, Evolution and Behavior.* New Brunswick, NJ: USA Transaction Publishers, 1995. xviii + 334 pp.

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Article:

The theory of genetically determined racial differences in ability and behaviour espoused by University of Western Ontario psychology professor J.P. Rushton first gained wide media attention in January of 1989, with Rushton's debut on the "Geraldo" television program, his debate with David Suzuki, and discussion of his writings on the CBC radio program "Quirks and Quarks." Now he has assembled his ideas into a book that has been reviewed and publicized by *The New York Times Book Review* (Oct. 16, 1994) and *The Globe and Mail* (Oct. 29 and Nov. 19, 1994).

Academics concerned with the question of race may find this book interesting. Although there is no new material to be found here, the book consolidates and condenses several of Rushton's earlier writings into one convenient source. Indeed, much of the material cited in the book comes from Rushton, Arthur Jensen, and Richard Lynn, all advocates of genetic race theory.

The table of contents will immediately catch the eye of a sociologist because the first chapter promises a "Revamping of the social sciences." The content, however, will disappoint. Rushton addresses questions and cites data that are dear to the psychology of individual differences, a specialty basing its methodology on the biological sciences. Most of the book examines physical measures and psychological test scores such as the intelligence quotient (IQ) and reaction time, and great emphasis is placed on Pearson correlations. There is no scholarly discussion or apparent appreciation of the aims, methods, and data peculiar to the social sciences. The promise of the book is to substitute genetic explanation in place of sociological analysis.

'The thesis of the book is that the single most important distinction among human beings in the world today is the genetic race of their ancestors and that most of the measured group differences in numerous physical and psychological attributes are the products of genes. Rushton proposes that modem humans first arose in Africa where conditions of life were supposedly quite congenial and exerted little pressure to evolve further; whereas those people who migrated to harsh northern climates were subjected to Darwinian natural selection favouring higher intelligence and therefore larger brains; smaller families and therefore smaller genitals and greater self-control. There were also other adaptations to arctic conditions, which led to the superiority of "Mongoloids" over "Caucasoids" and "Caucasoids" over "Negroids."

Much has already been written about the social harm done by this theory and the way it serves to incite racial hatred. Many gross inconsistencies in the arguments have also been noted, such as the subordinate social circumstances of the aboriginal peoples in the northern regions of Canada despite their hundreds of generations of living in the harshest of all climates, which should have endowed them with the highest IQ scores and the smallest families of anyone on the planet; or the historically high fertility of many Asian populations, that has declined rapidly with their recent industrialization and growing wealth.

I would like to focus on methodological issues, because I believe that great harm could be done to both the social and natural sciences if the standards for evidence and proof advocated in this book were to gain wider acceptance. In so doing, I will approach these questions from the perspective of my own specialty, the genetics of brain development and behaviour.

The author devotes an entire chapter to the cornerstone of his methodology, termed "aggregation" of evidence. In the chapters on brain size and IQ, he claims to show all relevant data from scientific journals and then he obtains a best estimate of group differences simply by averaging all the numbers, weighting every source more or less equally. He claims the result will be closer to the truth because errors of sampling and measurement are reduced by averaging. However, averaging does nothing to reduce *bias* in sampling and measurement, and such flaws are abundant in the cited literature. For example, among the 38 reports on brain weight, all but two gave figures for only one group, with most cases being people living in the nation of their ancestors, such as an article on Japanese living in Japan and another on Kenyans living in Kenya. The obvious differences in environment make all of these data of dubious worth for testing hypotheses about genetic causes of group differences. The methods of obtaining the brains were also far from contemporary standards for neuroscience. A report of five black Civil War soldiers from 1865 is given the same weight as a 1934 study of over 300 dead Kenyans. One of the two studies with more than one racial group involved the unclaimed bodies of the indigent and executed criminals in the Baltimore area. Those data varied greatly in the time from death to removal of the brain and method of preserving the brains. Numerous factors can affect measures of brain size, and valid inferences about group differences can be drawn only if it is certain that members of different groups were treated the same way. In my opinion, most of the data raked into one big pile by Rushton are worthless for scientific analysis and should be excluded. Unfortunately, Rushton has not done the hard work of separating the potentially valuable data from the trash. He misleads unwary readers by claiming that averaging many studies can overcome poor research methods.

Faced with this kind of criticism, Rushton tells us: "My response is that critics have failed to show an opposite predicted ordering in brain size, intelligence, sexual restraint..." (p. 236). For his critics to succeed, they supposedly must prove the null hypothesis that group differences are "randomly distributed around a mean of zero." This is a posture I term "chip-on-the-shoulder science." The author is an earnest believer in genetically determined race differences, and he vows to cling tenaciously to his world view unless his opponents can provide conclusive proof to the contrary. In my opinion, this is the kind of approach to be expected from religious zealots and politicians, not professional scientists. A rigorous evaluation of the evidence cited by Rushton reveals the methods in most studies were seriously flawed and render the data inconclusive. If the evidence is so poor, the proper action for a scientist is to suspend judgment. In reality, there is not one properly controlled study of brain size comparing representative samples of races in the entire world literature.

Such ardent partisanship also leads Rushton to proceed with genetic arguments on the basis of data that are obviously confounded with the environment. He claims that Africans have very low average IQ scores, even lower than American blacks. His evidence includes IQ test scores of black children in the Republic of South Africa prior to 1990 who were attending "typical primary schools" there, schools widely known to be substantially inferior to those of the ruling white minority. These numbers tell nothing about the role of genes, yet that is the way they are interpreted in this book. Rushton himself was raised in South Africa before moving to England, and he seems blind to the terrible injustices of apartheid and how these injustices have had a particularly severe impact in the primary school education of the black Africans.

Most of the data cited by the author are mere correlations, but he frequently perceives directions of causation from the biological to the social without engaging in formal statistical tests. He argues on the basis of correlation coefficients that genes code for brain size, larger brains score higher on IQ tests, and higher IQ leads to greater success in life. However, experimental studies with mammals have established that poor nutrition and health lead to smaller brain size as well as impaired learning, whereas enriched experience for adults can improve learning without changing brain size substantially. Thus, a mere correlation cannot establish causation by genes. In another passage, he reports that people who are friends have more similar blood types than

nonfriends. True to his reductionistic outlook, he argues that people's genes cause them to prefer affiliating with those more genetically similar to themselves. However, it is quite plausible that Canadian students tend to affiliate for cultural reasons with those more similar in ethnic background; hence the genetic similarity of friends would be a spurious correlate of ancient ethnic group differences in frequencies of different blood types.

Throughout the book, the author makes much of "significant" relationships that often entail rather small correlations, while he refrains from discussing the *strength* of relationships. His model appears to be linear and serial: genes determine brain size, brain size determines intelligence, and intelligence deter-mines success in education and work. For such a model, the correlation between group membership and a measure like socioeconomic status (SES) would then be the product of the correlations between group and brain size, brain size and IQ, and IQ and SES. Let us try this exercise with Rushton's own numbers. He obtained data from the US military on head measurements obtained for fitting helmets for more than 5,000 men and women, and these indicated significantly different average skull volumes of 1,371 and 1,356 cubic centimeters for Americans of European and African ancestry, respectively, with a standard deviation of about 100 cc. Thus, the group means differ by about .15 standard deviation, which corresponds to a point-biserial correlation between group and skull size of r = .075. His own data on Canadian students show a significant correlation between skull volume and IQ of about .20. It has also been observed that the correlation between adult IQ and SES is somewhat less than .5. Thus, the correlation between group and SES that would occur via this causal model is (.075)(.2)(.5) = .0075 and the square of this shows that the proportion of the total variation in SES that can be accounted for by the brain-IQ pathway is a trivial 0.006%. Rushton also cites data on a representative sample of more than 30,000 7 year-old American children of European and African ancestry where group mean head circumference was 51.5 and 51.2 cm, respectively, with a standard deviation of 1.55. Correlation of head circumference and IQ was about .2. Correlation of IQ at age 7 with measures of later grades in school and adult SES would be lower than .5. Hence, the largest conceivable correlation between group and later SES that could be attributed to the brain-IQ connection would be (.1)(.2)(.5) = .01, accounting for a minuscule 0.01% of the variance in SES. The explanatory power of Rushton's model is effectively zero, even though the correlations between pairs of variables are statistically significant owing to large samples. From a scientific perspective, it is hardly worth debating Rushton's model. 'Who cares whether a correlation of less than .02 is partly causal or entirely spurious?

One is left wondering why such a fuss is made about biology and race. In fact, why focus on race at all? Many contemporary social and biological scientists have concluded that it is not meaningful to categorize humans into three large groups. It is well established that the genetic variation *within* any geographical group greatly exceeds differences between groups. Detailed study of the information in the genes themselves (DNA molecules), especially the DNA of parts of the cell known as mitochondria, has allowed comparisons of many groups of humans as well as our nearest relative, the chimpanzee. This research has found the difference between the chimp and humans to exceed 69%, whereas the widest range between any two groups of humans is less than 3%. The human groups with the greatest difference between them occur in Africa, which supports the hypothesis that modern humans originated in Africa. Rushton, however, concludes from this evidence that "the human DNA closest to that of the apes occurs most commonly in Africa," which is a serious misinterpretation of the facts and a misrepresentation of the researchers' own conclusions. Today, the concept of race is more a social than a genetic category. Theories that urge the preeminence of the genes in racial differences in behaviour and social status are based on bad biology and shoddy statistical methodology.

The low standards of scholarship evident in this book render it largely irrelevant for modern science. The main question it raises in my mind is a sociological one: Why is so much attention devoted in the mass media to a work of this quality?