

## RACE, BRAIN SIZE, AND INTELLIGENCE: ANOTHER REPLY TO CERNOVSKY<sup>1</sup>

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*Summary.*—Five sets of observations require explanation. Firstly, within both black and white populations there is a small positive correlation between IQ and brain size whether or not there is control for body size. Secondly, racial differences in average brain size occur such that Mongoloids >Caucasoids >Negroids especially with control for body size. Thirdly, mammals with larger brains relative to their bodies perform better on learning tasks than mammals with smaller brains relative to their bodies. Fourthly, average racial differences on measures of cognitive performance parallel the differences in average brain size. Fifthly, average racial differences on numerous other traits parallel the differences in intelligence and brain size. It is incumbent on scientists to explain these facts.

Cernovsky (1991) incorrectly claims (a) that I use brain size to measure intelligence and (b) that I switch between absolute brain size and brain/body-size ratios to suit my purpose. While the causal relationships among race, brain size, body size, and intelligence are not fully understood (Jensen & Sinha, 1991), Cernovsky's note adds little clarification. Following a previous interchange (Cernovsky, 1990; Rushton, 1990b), I reiterate the known facts that require explanation.

One observation is that, within both the white and the black races, there is a small positive correlation between IQ and brain size (Jensen & Sinha, 1991; Lynn, 1990a; Rushton, 1990a). This relationship is there regardless of whether one controls for body size, although the relationship may be attenuated when height is controlled. As Jensen and Sinha (1991) discuss, when height and body weight are controlled, the best estimate of the correlation between intelligence and brain size is 0.30. Using magnetic resonance imaging to scan directly the brains of 40 white college students, the correlation between IQ and brain size even after controlling for body height and weight was 0.35 (Willerman, Schultz, Rutledge, & Bigler, in press).

Another observation is that the three major races differ in average brain size in the direction Mongoloids >Caucasoids >Negroids. This ordering is observed whether measured by brain weight at autopsy, by internally measured cranial capacity, or by cranial capacity estimated from external head measurements; see Rushton (1990a) and Lynn (1990a) and critiques by Cain and Vanderwolf (1990) and Vanderwolf and Cain (1991). These relationships between race and brain size are often observed without corrections being made for body size; when such corrections are made, racial differences typically become more salient because Mongoloids are smaller than Caucasoids and Negroids.

Thirdly, with respect to data on comparisons across species, some mammals such as elephants have larger brains than humans. Most of these larger brains, however, go to control larger bodies. It is for this reason that attempts are made to scale brains to bodies using techniques such as the "encephalization quotient" (EQ) derived from the regression of cranial capacity on general body size (Jerison, 1973). Cernovsky (1991) follows Cain and Vanderwolf (1990) in rejecting these attempts at scaling as inadequate. However, studies have shown that, across spe-

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cies, these quotients predict performance on visual discrimination learning tasks (e.g., "Pick the same object each time to get food") in the same way that IQs do within children. More intelligent children, assessed by standardized tests, learn these strategies faster than those less intelligent, and primates and other mammals with larger EQs learn faster than those with smaller EQs (Passingham, 1982). On the basis of such evidence, Jerison (1982) claims the EQ as a measure of the "biological intelligence" of various species.

Fourthly, in the light of all the above, it seems reasonable to conjecture whether the well established black-white differences in IQ (Jensen, 1985, 1987) and the increasingly apparent Oriental-white differences in IQ (Lynn, 1987) are mediated, at least in part, by the group differences in brain size. Note that this is not the same as saying, as Cernovsky alleges, that brain size is a measure of intelligence. Nor does it indicate anything about the magnitude of the relationship. Certainly, it may be that some corrections for body size will turn out to be more useful for clarifying the brain size-IQ link than others, and IQ will probably correlate better with finer grained indices of the brain than with over-all size. So, too, sex differences may occur in the relations among the variables of intelligence, brain size, and body size (Willerman, *et al.*, in press). Unraveling complexities, however, is the way of science and does not undermine the value of the currently known facts, as Cernovsky (1991) seems to allege.

Finally, it is important to repeat (and emphasize) that the racial pattern found with brain size and IQ, that is, Mongoloids at one end of a continuum, Negroids at the other, and Caucasoids somewhere in between, is also found on more than 50 other variables, with measures made of maturational speed, personality and temperament, reproductive effort, and social organization (see Rushton, 1990b, Table 1). For example, the rate of dizygotic two-egg twins per 1,000 births is 4 among Mongoloids, 8 among Caucasoids, and 16 or more among Negroids, without regard to country from which the samples are drawn. The central scientific question is: why should Caucasoid populations average so consistently between Negroid and Mongoloid populations on so many variables? While socialization and nutrition will obviously have significant influence on many variables, possibly including brain-size development (Lynn, 1990b), other observations imply there is also evolutionary and therefore genetic causation.

No known environmental variable is capable of producing the inverse relationship between gamete production and brain size or of causing so many diverse variables to correlate in so comprehensive a fashion. There is, however, a genetic one: evolution. The racial ordering may correspond to what is familiar to evolutionary biologists as the  $r$ - $K$  scale of reproductive strategy. At one end of this scale are " $r$ -strategies," which emphasize high reproductive rates, and at the other " $K$ -strategies," which emphasize high parental investment, the bioenergetic tradeoff between these two has been postulated to underlie cross-species differences in numerous life-history characteristics (Wilson, 1975). I suggested that Mongoloids are more  $K$ -selected than Caucasoids, who in turn are more  $K$ -selected than Negroids, with environmental influences accounting for about 50% of the variance on most traits (Rushton, 1988).

I also mapped the  $r$ - $K$  scale of reproductive strategies onto human evolution using studies of genetic distancing drawn from molecular biology, including the analysis of DNA sequencing. I suggested that groups more  $K$ -selected in their reproduction strategy emerged later in the evolutionary process than groups less  $K$ -selected. Archaic versions of the three races are envisaged as emerging from the ancestral hominid line, out of Africa, in the following order: Negroids about 200,000 years ago, Caucasoids about 110,000 years ago, and Mongoloids about 41,000 years ago (Stringer & Andrews, 1988). Such an ordering fits with and helps explain the way in which the variables I studied are found to cluster. Negroids, the earliest to emerge, were least  $K$ -selected; Caucasoids, emerging later, were next least  $K$ -selected; and Mongoloids, emerging latest, were the most  $K$ -selected.

Focusing on a network of international evidence allows more chance of finding powerful theories than does examining any individual dimension in one particular country. The theory I have proposed needs testing and comparing with alternatives, not disparagement and obfusca-

tion. It is incumbent on scientists to explain the mean differences among the three major racial groupings.

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