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RACE, BRAIN SIZE, AND INTELLIGENCE: A REPLY TO CERNOVSKY[1]

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Summary.—Cernovsky's 1990 critique of my work on the relation between brain size and IQ inadequately presents my position. I did not address the issue of sex differences in brain size nor did I conclude that "women are less intelligent than men" (p. 337). In the autopsy study cited by Cernovsky, it was concluded that, when body size is controlled, the male-female difference in brain size is removed but the black-white difference in brain size remains. Cernovsky also ignores much additional data, including that Mongoloid populations have larger and heavier brains than Caucasoids. Here, I review evidence on the relation between (a) brain size and race and (b) brain size and intelligence. Data are also tabulated for personality, speed of maturation, and sexuality, on all of which the Caucasoid average consistently falls between those of Mongoloids and Negroids. This ordering may be explained by a gene-based evolutionary theory of *r*/*K* reproductive strategies in which Mongoloids are more *K*-selected than Caucasoids and Caucasoids more than Negroids.

Since World War I when widespread testing began, Caucasoids have been scoring 1 standard deviation higher than Negroids on measures of cognitive performance and on assessments of educational and occupational attainment, whether tested in the United States, the United Kingdom or in Jamaica, Nigeria, Tanzania, and Uganda (Buj, 1981; Lynn, 1978; Jensen, 1985, 1987). Fewer people are aware, however, that Mongoloids often score higher than do Caucasoids on exactly the same tests, whether examined in Canada and the United States, or in their home countries (Lynn, 1987). It is reasonable to hypothesize that among races differences in brain size may mediate the observed differentials in cultural achievements. A review of this literature (Rushton, 1988a, 1988b) found that here, and also on many other variables, the Caucasoid average falls consistently *between* those of Mongoloids and Negroids; see Table 1. This pattern offers an array of theoretical and empirical problems for analysis; it has also produced a great deal of debate (Rushton, 1989a, 1989c; Rushton & Bogaert, 1987, 1988, 1989; for criticisms, see Cain & Vanderwolf, in press a, in press b; Flynn, 1989; Lynn, 1989a, 1989b; Roberts & Gabor, in press; Silverman, 1990; Weizmann, *et al.*, 1990; Zuckerman & Brody, 1988).

Brain Size and Race

Cernovsky (1990) claims that because Ho, *et al.* (1980b) found a 136-g difference in brain weight between men and women, for which there is no

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concomitant difference in IQ, that it is not logical for me to interpret the 100-g difference between blacks and whites also noted by Ho, *et al.* (1980b) as indicative of racial group differences in intelligence. Cernovsky's critique, however, does not sufficiently recognize Ho, *et al.*'s (1980a) conclusion that, when body size is corrected for, then the sex gap is eliminated but the racial difference remains intact.

TABLE 1
RELATIVE RANKING OF POPULATIONS ON LIFE-HISTORY VARIABLES

	Mongoloids	Caucasoids	Negroids
Brain weight and intelligence			
Cranial capacity	1448 cc	1408 cc	1334 cc
Brain weight at autopsy	1351 g	1336 g	1286 g
Millions of "excess neurons"	8900	8650	8550
IQ test scores	107	100	85
Maturation rate			
Gestation time	?	Medium	Early
Skeletal development	?	Medium	Early
Age of walking	Late	Medium	Early
Age of first intercourse	Late	Medium	Early
Age of first pregnancy	Late	Medium	Early
Life-span	Long	Medium	Short
Personality and temperament			
Activity level	Low	Medium	High
Aggressiveness	Low	Medium	High
Cautiousness	High	Medium	Low
Dominance	Low	Medium	High
Impulsivity	Low	Medium	High
Sociability	Low	Medium	High
Reproductive effort			
Multiple birthing rate	Low	Medium	High
Size of genitalia	Small	Medium	Large
Secondary sex characteristics	Small	Medium	Large
Intercourse frequencies	Low	Medium	High
Permissive attitudes	Low	Medium	High
Sexually transmitted diseases	Low	Medium	High
Androgen levels	Low	Medium	High
Social organization			
Law abidingness	High	Medium	Low
Marital stability	High	Medium	Low
Mental health	High	Medium	Low

The data on cranial capacity summarized in Table 1 are based on an averaging of the absolute scores found in the literature review (Rushton, 1988a, 1988b). If the brain-body allometric regression is taken into account, the rank ordering of Mongoloids > Caucasoids > Negroids is increased because in

body size, at least within the United States, Negroids > Caucasoids > Mongoloids (Eveleth & Tanner, 1976). Moreover, since the Rushton (1988a, 1988b) reviews of racial differences in brain size were completed, more published data have come to my attention. Beals, *et al.* (1984) reported a worldwide survey of 20,000 crania grouped by continental area where, in average cubic centimeters, brain cases from Asia = 1380, Europe = 1362, and Africa = 1276. The difference between these estimates and those reported in Table 1 is based on the fact that Beals, *et al.* made a standard 6% reduction for the data gathered using Broca's method of filling the crania with shot. When this 6% reduction is taken into account, the confirmation of the pattern seems striking.

Brain Size and Intelligence

Some may doubt that there is any relation between brain size and intelligence; however, as shown in Table 2, there have been at least 20 separate investigations of the question, including two by Rushton carried out on university students, with intelligence measured by Jackson's (1984) Multidimensional Aptitude Battery and with maximum head circumference measured by tape. Between IQ and head circumference were $rs = .18$ and $.20$ ($ps < .01$). Of importance to note in Table 2 is the study by Willerman, *et al.* (1989) who used (a) a tape for which measure the correlation with IQ was .17 and also (b) magnetic resonance imaging to scan the brain for which measure the correlation with IQ was .35. In light of these consistent findings, many of which controlled for body size, it is doubtful whether anyone could fail to reach the conclusion that there is a small positive association between brain size and intelligence in man. There seems little reason to alter Van Valen's (1974) estimate that, after corrections are made for the imperfect reliability of intelligence tests and for head circumference as a measure of brain size, that the "true" figure is about .30.

Brain size is related to intelligence both within and between races. It seems that it is as much for egalitarian and ideological reasons as for scientific ones that attacks on this conclusion are made. For example, Cernovsky claims that I have "resuscitated . . . old fashioned racist doctrines." This is completely untrue. What I have done is to use evolutionary biology to explain the racial differences on the many variables summarized in Table 1 wherein Caucasoids consistently average between Mongoloids and Negroids.

r/*K* Evolutionary Theory

The racial pattern may be ordered by a theory stemming from animal evolution in which *r*/*K* reproductive strategies are applied to human differences and in which Mongoloids are posited to be more *K*-selected than Caucasoids and Negroids. The symbols *r* and *K* originate in the mathematics of population biology and can be used to designate two ends of a continuum

involving tradeoffs between production of offspring and parental care and survival (Rushton, 1985; following Wilson, 1975). To illustrate on a macroscale, oysters, producing 500 million eggs a year but providing no care to them exemplify the *r*-strategy, while the great apes, producing one infant every 5 or 6 years and providing lavish care, exemplify a *K*-strategy. *K*-selected reproductive strategies emphasize parental care and are to be contrasted with *r*-selected strategies which emphasize fecundity, the bioenergetic tradeoff between which is postulated to underlie cross-species differences in brain size, speed of maturation, reproductive effort, and longevity.

TABLE 2
SUMMARY OF STUDIES ON HEAD SIZE AND INTELLIGENCE

Reference	Sample	*r*
Pearson (1906)	4,486 British children	0.11
Pearson (1906)	1,011 British university students	0.11
Pearl (1906)	935 Bavarian soldiers	0.14
Murdoch and Sullivan (1923)	595 American children	0.19
Reed and Mulligan (1923)	449 university students	0.08
Sommerville (1924)	105 university students	0.10
Porteus (1937)	200 Australian children	0.20
Schreider (1968)	326 French farmers	0.23
Klein, *et al.* (1972)	170 Guatemalan children	0.27
Weinberg, *et al.* (1974)	334 American boys	0.35
Broman, *et al.* (1975)	26,760 American children	0.17
Fisch, *et al.* (1976)	2,010 American children	0.23
Passingham (1979)	415 British adults	0.03
Susanne (1979)	2,071 Belgian conscripts	0.19
Henneberg, *et al.* (1985)	302 Polish students	0.14
Lynn (1989)	310 Irish children	0.18
Bogaert and Rushton (1989)	216 Canadian university students	0.18
Rushton and Bogaert (in prep.)	284 Canadian university students	0.20
Willerman, *et al.* (1989)	40 American university students, a	0.17*
	40 American university students, b	0.35†

*Measured by tape.
†Measured by magnetic resonance imaging.

In studies of dandelions, fish, flies, milkweed bugs, and field mice, many of the covariant *r*/*K* life-history traits are also found within species and to be genetic in origin. There is no reason why such analyses should not be applied to human differences. For example, one analysis contrasted, within the Caucasoid population, the characteristics of the mothers of dizygotic twins who, because they produce more than one egg at a time can be considered to represent the *r*-strategy, with the mothers of singletons representing the *K*-strategy. As expected, the former were found to have a lower age of menarche, a shorter menstrual cycle, a higher number of marriages, a higher

rate of coitus, a greater fecundity, more wasted pregnancies, an earlier menopause, and an earlier mortality (Rushton, 1987).

In another domain is the work of Ellis (1987, 1989) applying *r*/*K* theory to crime. Ellis (1987) contrasted the characteristics of criminals who, because they are lower in altruism and social organization can be considered to represent the *r*-strategy, with the general population representing the *K*-strategy. The criminals were found to have, on average, shorter gestation periods (more premature births), a more rapid development to sexual functioning, a greater copulatory rate outside of bonded relationships (or at least a preference for such), less stable bonding, a lower parental investment in offspring (as evidenced by higher rates of child abandonment, neglect and abuse), and a shorter life expectancy. Ellis (1989) also analyzed rape from an *r*/*K* perspective linking forced copulation to an *r*-reproductive strategy. Regarding race differences, he theoretically derived the prediction that "blacks should have higher rape rates than whites, and whites in turn should have higher rates than Orientals" (p. 94). Recent analyses of data from 88 different countries confirm Ellis' prediction regarding differences by race in rape behavior (Rushton, in press b).

Discussion

The hypothesis that the more complex the nervous system and the larger the brain, the more complex will be the behavior is one that goes back to at least Darwin (1871) and Galton (1869). Nonetheless, it remains a much debated set of topics, particularly when racial differences are considered; for another recent set of exchanges on the topic of brain size, see Cain and Vanderwolf (in press a, in press b), and also R. Lynn (in press) and Rushton (in press a).

In discussing ethnic and racial group differences it is very difficult not to cause offense. For humanitarian reasons many scientists believe such treatments are inappropriate given our current state of knowledge. Political and social sensitivities abound in ways that do not apply to other areas of scientific investigation. Consequently, brain size and genetic differences are not currently listed as alternative hypotheses to explain the very clear group differences between the races in educational achievement.

The likelihood that the racial group differences in cognitive performance are partly genetic is increased by the finding that the differentials are greatest on the more genetically influenced of intelligence subtests (Jensen, 1973). This is a differential prediction; such a correlation is expected only if the racial group differences are due to the genes; if the differences are due to environmental factors, the differentials would be greatest on the more environmentally influenced of intelligence subtests. For example, with IQ, the most heritable components in Japan are those on which black and white individuals in the United States differ the most (Rushton, 1988b).

Adopting an evolutionary outlook does not disconfirm the democratic ideal. As Wilson (1978) put it: "We are not compelled to believe in biological uniformity in order to affirm human freedom and dignity" (p. 52). As Enrico Fermi remarked, "Whatever Nature has in store for mankind, unpleasant as it may be, men must accept, for ignorance is never better than knowledge." Ultimately, the study of racial differences may help us to appreciate more fully the nature of human diversity as well as the binding commonalities we share with other species.

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