Reply to Willerman on Mongoloid–Caucasoid Differences in Brain Size

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Willerman’s (1991) critique is based on an apparent misapprehension of the notion of relative brain size. That Caucasoids are three standard deviations above the Mongoloid mean in body weight, but only two standard deviations higher in cranial capacity shows unequivocally that Caucasoids have relatively smaller brains than Mongoloids. It translates into a relative advantage for Mongoloids of 1460 cm³ versus 1446 cm³ when body-size variables are controlled. That body weight is a substantial predictor of cranial capacity is not in dispute; it is obvious when comparisons are made across species, for example, humans compared to elephants. It is for this reason that attempts are made to scale brains to bodies using techniques such as the encephalization quotient.

Willerman (1991) raised several points in his commentary, some of which I agree with, although they are presented as if in refutation of my article (Rushton, 1991). Other points are based on a misreading of what I wrote. For example, Willerman (p. 363) claimed that “unmentioned in Rushton’s article, the Caucasoids have substantially greater absolute cranial capacity than the Mongoloids” (his emphasis). However, I stated that this was the case quite clearly in the first line of the results section: “The unadjusted cranial capacity estimates for 4 Mongoloid samples averaged 1343 cm³ and 20 Caucasian samples averaged 1467 cm³” (p. 354).

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When the relative brain weights were examined as encephalization quotients (EQs), the Mongoloid–Caucasoid difference was statistically significant.

Willerman appeared to have misapprehended the implications of relative brain size. His position, that body weight is a substantial predictor of cranial capacity, is not in dispute. This becomes obvious when comparisons are made across species, where some mammals, such as elephants, have larger brains than humans. Much of this larger brain, however, goes to control their larger bodies. Thus, brain mass is scaled to body size using techniques such as the EQ derived from the regression of cranial capacity on general body size (Jenson, 1973). Across species, 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 less intelligent children, and primates and other mammals with larger EQs learn faster than those with smaller EQs (Passingham, 1982). Therefore, Jerison (1982) claimed that EQ was a measure of the “biological intelligence” of various species.

Willerman objected to my extrapolation of the EQ from macroscale comparisons across species to microscale comparisons across subspecies (races). Willerman complained that I ignored Jerison’s (1990) “unambiguously stated” conclusion that the EQ cannot be applied within Homo. Jerison’s (1990) opinion, however, was merely that, when between-species relationships, such as the EQ, are applied within-species, “the correlation is much lower and may fall to zero; within-species effects are still poorly understood” (p. 361). Although the EQ method of controlling body size may not be ideal (with a large sample size, ANCOVA would be better), in my article the use of the EQ reveals relationships that require explanation, not dismissal.

Willerman’s finding that Panels A to D in his Figure 1 all have the same slope is irrelevant. The important point is that the Mongoloid–Caucasoid intercepts vary by 14 cm³. Thus, at any given weight, and on average, Mongoloids have 14 cm³ more brain volume than Caucasoids.

The difference between Willerman’s position and mine is quite small. For my part, I stated in the discussion “It must be emphasized that the results reported here were not statistically powerful and much more research is required before any firm conclusions can be reached” (pp. 354–355). For Willerman’s (p. 364) part, he acknowledged that “trustworthy studies already have demonstrated racial differences using direct measures of endocranial volume or brain size (Beals, Smith, & Dodd, 1984, Ho, Roessmann, Straumfjord, & Monroe, 1980).” It is my view, in addition, that externally measured head size produces the same average racial ordering as internally measured brain cases and wet brains at autopsy, that is, Mongoloid > Caucasoid > Negroid (for further evidence, see Jensen & Sinha, in press, Lynn, 1990, Rushton, 1990).
REFERENCES

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Lynn, R (1990) New evidence on brain size and intelligence A comment on Rushton and Cain and Vanderwolf Personality and Individual Differences, 11, 795–797