



## FALLACIOUS ANALYSES CANNOT TEST FOR RACIAL DIFFERENCES: A REPLY TO GOREY AND CRYNS

J. Philippe Rushton<sup>1</sup> and C. Davison Ankney<sup>2</sup>

<sup>1</sup>Department of Psychology, University of Western Ontario, London, Ontario, Canada N6A 5C2 and

<sup>2</sup>Ecology and Evolution Group, Department of Zoology, University of Western Ontario, Canada N6A 5B7

(Received 21 December 1994)

**Summary**—Although insufficient information was provided to allow an examination of the actual calculations in Gorey and Cryns' meta-analysis, their results and conclusions are demonstrably false. For example, they erroneously reported the point-biserial effect size  $r$  of the white-black difference in IQ alternately as 0.226 and 0.022, even though it is known that the actual value is 0.50 ( $100 - 85/15 = z$  score of 1.00 which transforms to the point-biserial  $r$  of 0.50). Gorey and Cryns' analysis also failed to detect widely acknowledged black-white differences in out-of-wedlock births, crime, and numerous other indicators of 'social organization'. Much of this failure to detect reality was due to inclusion of 'matched samples' at distributional extremes. Regardless, their conclusions do not follow from their analyses. First, their only statistically significant results were consistent with those reported by Rushton (*Personality and Individual Differences*, 9, 1009-1024, 1988). Second, their 'per cent variance accounted for' argument is statistically correct but substantively erroneous. Finally, Gorey and Cryns excluded from discussion macrophysiological variables like testosterone, rate of two-egg twinning, and brain size (which, like IQ, also shows a black-white  $r = 0.50$ ). The racial gradient on all these variables is found worldwide and is directly relevant to causal analysis.

### INTRODUCTION

Gorey and Cryns (1995) syllogized that, in the United States, (a) behavioral differences among blacks, whites, and Asians are slight, (b) these differences are easily explained by socioeconomic factors, and so (c)  $K$ -selection theory crumbles. To support their claim, Gorey and Cryns provided a meta-analysis of effect sizes between racial groups in the form of the point-biserial correlation  $r$  and, they concluded, the resulting  $r^2$  percentage variance accounted for was very small.

A major problem with Gorey and Cryns' analysis is their inclusion of matched samples, e.g. for IQ, racial samples matched on 'personal educational achievement'. Because these two variables are so highly correlated, this is analogous to matching men and women on height and looking for sex differences in leg length. Such an analysis will find little if any difference, but this does not mean that men and women are similar in height and leg length! Gorey and Cryns miss the point that the question of interest concerns overall racial differences, e.g., "do whites have greater IQs (and personal educational achievement) than do blacks?," not "do blacks and whites with similar personal educational achievement have similar IQs?"

Gorey and Cryns' conclusions are empirically and conceptually in error. The white-black IQ difference divided by the standard deviation is  $100 - 85/15 = 1.00$  (Jensen, 1985) which transforms to an  $r$  of 0.50 (Hunter & Schmidt, 1990: 235), but Gorey and Cryns reported the  $r$  as 0.226 from Rushton's (1988) review and as 0.022 from a 'random sample' of their own. Other sections are similarly awry. Their Table 1 showed no difference between whites and blacks in 'social organization,' despite the disproportionate representation of African-Americans in rates of illegitimacy, crime, and welfare dependency (Jaynes & Williams, 1989). Perhaps this was because Gorey and Cryns explicitly used methods of socioeconomic adjustment based on sample restriction or *matching*, as in the study they cited by Oldroyd and Howell (1977) of blacks and whites in the Utah State Prison. Sampling from such matched groups is certain to minimize differences. The major question is "are there disproportionately more blacks in prison?," not "do black and white inmates differ?" Even despite this matching, 46/73 of the outcomes from Gorey and Cryns' analysis were in support of Rushton's hypothesis ( $P < 0.001$ ). Further, Gorey and Cryns found that of their nine overall analyses (their Table 1), four showed significant differences in the 'right' direction; the remaining five were nonsignificant.

Regardless, the 'percent variance accounted for' argument is statistically correct, but erroneous in substance as discussed at length by proponents of meta-analysis, including Rosenthal (1984) and Hunter and Schmidt (1990). The  $r^2$ , and other indices of 'per cent variance accounted for', are related in a very nonlinear way to the magnitude of effect sizes that determine impact in the real world, that is, small correlations can have large impacts. An effect size of even 0.10 for a medical procedure, for example, would increase the chance of success from 50:50 to 55:45. A relatively small difference at the mean can generate large differences at the tails of the distribution. Even if Gorey and Cryns' (Table 1) minimal effect sizes of 0.10–0.14 for a greater black than white 'sexuality' were correct, there would still be a black/white ratio of 2: 1 at the 95th percentile. Such a difference could help to explain the disproportional incidence of AIDS and other sexually transmitted diseases (Rushton, 1995).

There are other good reasons to doubt Gorey and Cryns' hypothesis that socioeconomic levels are the cause rather than the result of Asian–white–black gradients in behavior. For example, transracial adoption studies show that African-American and Korean children raised in white middle-class families grow to be more similar to their biological parents than to their adoptive parents in intelligence and personality (reviewed in Rushton, 1995). It is notable that Gorey and Cryns omitted any international comparisons and excluded macrophysiological variables like brain size, testosterone, and rate of two-egg twinning, although these bear directly on causal analysis.

With respect to international comparisons, consider crime. Using data from the 1984 and 1986 INTERPOL yearbooks, Rushton (1990) found that African and Caribbean countries reported twice the amount of violent crime (murder, rape, and serious assault) as did European countries, and three times more than did countries in the Pacific Rim. The summed figures per 100,000 population were, respectively, 142, 74, and 43.

In a meta-analytic critique of these data, similar to the one employed by Gorey and Cryns, Cernovsky and Litman (1993) found a 0.16 correlation for a greater black than white likelihood to break the law, and a 0.32 correlation for the Asian/African difference. Cernovsky and Litman dismissed these as trivial, but, Rushton (1994a) showed it is erroneous to dismiss such effect sizes. For example, a correlation of 0.32 between a treatment and an effect means that a treatment that accounts for only 10% of the variance could reduce the crime rate by almost 50 percent (Rosenthal, 1984: 130).

As reviewed in *Race, Evolution and Behavior* Rushton (1995), studies show that levels of the sex hormone testosterone differ, on average, among races, with Africans averaging the highest levels, Caucasians the next highest, and Asians the lowest. Testosterone affects numerous brain-behavior systems and may help to explain race differences in temperament, family stability, sexuality and rate of two egg twinning. The rate of two-egg twins per 1000 births (caused by a double ovulation) is 16 or greater among Africans and African-Americans, eight among Europeans and European-Americans, and four or less among Asians and Asian-Americans.

Brain size is an especially important variable in light of its increasingly well established relationship with IQ (Egan, Chiswick, Santosh, Naidu, Rimmington & Best, 1994; Wickett, Vernon & Lee, 1994). In a stratified random sample of 6325 U.S. Army personnel, Rushton (1992) found that after adjustment for effects of body size, sex, and military rank, self-defined Asians, Whites, and Blacks averaged cranial capacities, respectively, of 1416, 1380, and 1359 cm<sup>3</sup>. With data from tens of thousands of people from around the world, collated by the International Labour Office in Geneva, Rushton (1994b) found that after adjusting for the effects of body size and sex, samples from the Pacific Rim, from Europe, and from Africa averaged cranial capacities of 1308, 1297, and 1241 cm<sup>3</sup>, respectively. These estimates of cranial size confirm the racial pattern established by wet brain weight at autopsy and endocranial volume from skulls (Beals, Smith & Dodd, 1984; Ho, Roessmann, Straumfjord & Monroe, 1980). Black–white differences in brain size from these four studies show an average effect size of about 0.50.

## CONCLUSION

Gorey and Cryns used data from many inappropriate studies, ignored international comparisons, excluded data on important macrophysiological variables, and misinterpreted the relation between effect size and explained variance. Despite these failings, all statistically significant results from their meta-analysis were consistent with those reported by Rushton (1988). This indicates that the racial

differences reported by Rushton (1988, 1995) are so robust that even biased samples and fallacious analyses cannot obscure them.

## REFERENCES

- Beals, K. L., Smith, C. L. & Dodd, S. M. (1984). Brain size, cranial morphology, climate, and time machines. *Current Anthropology*, 25, 301–330.
- Cernovsky, Z. Z. & Litman, L. C. (1993). Re-analyses of J. P. Rushton's crime data. *Canadian Journal of Criminology*, 35, 31–36.
- Egan, V., Chiswick, A., Santosh, C., Naidu, K., Rimmington, J. E. & Best, J. J. K. (1994). Size isn't everything: A study of brain volume, intelligence and auditory evoked potentials. *Personality and Individual Differences*, 17, 357–367.
- Gorey, K. M. & Cryns, A. G. (1995). Lack of racial differences in behavior: A quantitative replication of Rushton's (1988) review and an independent meta-analysis. *Personality and Individual Differences*, 19, 345–353.
- Ho, K. C., Roessmann, U., Straumfjord, J. V. & Monroe, G. (1980). Analysis of brain weight. I & II. *Archives of Pathology and Laboratory Medicine*, 104, 635–645.
- Hunter, J. E. & Schmidt, F. L. (1990). *Methods of meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: Sage.
- Jaynes, G. D. & Williams, Jr., R. M. (Eds.), (1989). *A common destiny: Blacks and American society*. Washington, DC: National Academy Press.
- Jensen, A. R. (1985). The nature of the black–white difference on various psychometric tests: Spearman's hypothesis. *Behavioral and Brain Sciences*, 8, 193–263.
- Oldroyd, R. J. & Howell, R. J. (1977). Personality, intellectual, and behavioral differences between black, Chicano and white prison inmates in the Utah State Prison. *Psychological Reports*, 41, 187–191.
- Rosenthal, R. (1984). *Meta-analytic procedures for social research*. Newbury Park, CA: Sage.
- Rushton, J. P. (1988). Race differences in behavior: A review and evolutionary analysis. *Personality and Individual Differences*, 9, 1009–1024.
- Rushton, J. P. (1990). Race and crime: A reply to Roberts and Gabor. *Canadian Journal of Criminology*, 32, 315–334.
- Rushton, J. P. (1992). Cranial capacity related to sex, rank, and race in a stratified random sample of 6,325 U.S. military personnel. *Intelligence*, 16, 401–413.
- Rushton, J. P. (1994a). Race and crime: A reply to Cernovsky and Litman. *Canadian Journal of Criminology*, 36, 79–82.
- Rushton, J. P. (1994b). Sex and race differences in cranial capacity from International Labour Office data. *Intelligence*, 19, 281–294.
- Rushton, J. P. (1995). *Race, evolution and behavior: A life history perspective*. New Brunswick, NJ: Transaction.
- Wickett, J. C., Vernon, P. A. & Lee, D. H. (1994). *In vivo* brain size, head perimeter, and intelligence in a sample of healthy adult females. *Personality and Individual Differences*, 16, 831–838.