

CONTRIBUTIONS TO THE HISTORY OF PSYCHOLOGY: XC.
EVOLUTIONARY BIOLOGY AND HERITABLE TRAITS
(WITH REFERENCE TO ORIENTAL-WHITE-BLACK
DIFFERENCES): THE 1989 AAAS PAPER^{1, 2, 3}

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Summary.—Genetic distance estimates calculated from DNA sequencing indicate that in years since emergence from the ancestral hominid line, Mongoloids = 41,000, Caucasoids = 110,000, and Negroids = 200,000. Data also show that this succession is matched by numerous other differences such that Mongoloids > Caucasoids > Negroids in brain size and intelligence (cranial capacity = 1448, 1408, 1334 cm³; brain weight = 1351, 1336, 1286 gm.; millions of excess neurons = 8900, 8650, 8550; IQ = 107, 100, 85); maturational delay (age to walk alone, age of first intercourse, age of death); sexual restraint (ovulation rate, intercourse frequencies, sexually transmitted diseases including AIDS); quiescent temperament (aggressiveness, anxiety, sociability); and social organization (law abidingness, marital stability, mental health). This pattern is ordered by a theory of *r/K* reproductive strategies in which Mongoloids are posited to be more *K*-selected than Caucasoids and especially more than Negroids. (*K*-selected reproductive strategies emphasize parental care and are to be contrasted with *r*-selected strategies which emphasize fecundity, the bioenergetic trade-off between which is postulated to underlie cross-species differences in brain size, speed of maturation, reproductive effort, and longevity.) It is suggested that this pattern came about because the ice ages exerted greater selection pressures on the later emerging populations to produce larger brains, longer lives, and more *K*-like behavior. One theoretical possibility is that evolution is progressive and that some populations are more "advanced" than others. Predictions are made concerning economic projections and the spread of AIDS.

Following a review of the world literature, Table 1 shows that data from twin and adoption designs converge in showing that approximately 50 percent of the variance in individual differences both for intelligence and for personality is due to the genes and that about 50 percent is due to the envi-

¹This is the text of an oral paper presented at the symposium on "Evolutionary Theory, Economics, and Political Science: An Emerging Theoretical Convergence" at the Annual Meeting of the American Association for the Advancement of Science, San Francisco, California, January 19, 1989. The presentation generated major controversy in Canada including calls for my dismissal by the Premier of Ontario, a criminal investigation by the Ontario Provincial Police, a media campaign of opposition, and disruptions at the university. Requests continue to be made for copies of the unpublished talk. Although the papers marked in press have appeared, along with extended additional documentation, this publication hereby makes the original text and the overhead projections used at the time publicly available.

²This paper was received three years after the oral presentation, and there have been published critiques and replies concerning the thesis contained therein. We have published it here on Dr. Rushton's request for the reasons he states: given the public controversy this paper aroused, scholars will wish to have the published text available for reference as by this time, the contribution is primarily historical. The Editors.

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TABLE 1
SIMILARITY IN FAMILY MEMBERS RAISED APART AND TOGETHER

Groups	Intelligence		Personality	
	No. of Pairs	Intraclass Correlation	No. of Pairs	Intraclass Correlation
Identical Twins Reared Apart	65	.72	106	.54
Identical Twins Reared Together	4,672	.86	5,000	.52
Fraternal Twins Reared Apart	29	.47	20	.18
Fraternal Twins Reared Together	5,546	.60	8,000	.23
Biological Siblings Reared Apart	203	.24	—	—
Biological Siblings Reared Together	26,473	.47	17	.20
Adoptive Siblings Reared Together	369	.34	78	.07

ronment (Rushton, 1988a). If this apportionment of causal influences pertained only to people's height and weight, there would be little debate. Because differences in intelligence and personality can result in cultural and economic inequalities, however, the topic has become contested. I suggest this opposition is based more on humanitarian than on scientific considerations and that nowhere is this more true than in study of race. Perhaps as Arthur Jensen (1984) once suggested, human sociobiology will begin to make real progress only after the race issue has been met head-on. Race differences therefore will be a major theme for the rest of my talk.

Current evidence from studies of genetic distances based on analyses of DNA sequencing indicate that the races diverged at different times. In years since emergence from the ancestral hominid line, Mongoloids = 41,000, Caucasoids = 110,000, and Negroids = 200,000 (Stringer & Andrews, 1988). This succession is matched by multifarious other differences including brain size and intelligence, rate of maturation, sexuality, personality, and social organization. This paper condenses a series of recently published and "in press" articles (see Rushton, 1985a, 1988a, 1988b, in press a, in press b, Rushton & Bogaert, 1987, 1988, in press).

BRAIN SIZE AND INTELLIGENCE

Since the time of World War I when widespread testing began, Blacks have scored about 1 standard deviation lower than Whites on tests of intelligence (IQ) and educational attainment, whether tested in the United States, the United Kingdom, or in Jamaica, Nigeria, Tanzania, and Uganda (Table 2). Fewer people are aware, however, that Orientals score one-third of a standard deviation *higher* than Whites on exactly the same measuring instruments whether tested in Canada and the United States (Vernon, 1982) or in their home countries (Lynn, 1987).

It may also come as something of a surprise to learn that the same order is observed with measures of *brain size*, whether indexed by cranial capacity

from inside the skull or brain weight at autopsy. I have averaged numerous estimates, some quite recent, finding for cranial capacity Orientals 1448 cc, Whites 1408 cc, Blacks 1334 cc, and for brain weights, Orientals 1351 gm, Whites 1336 gm, and Blacks 1286 gm (Rushton, 1988a, 1988b, in press a). Moreover, while brainweight begins to decrease around age 25 years in European samples, the decrease does not begin until the mid-30s in Japanese samples. A similar ordering also results from estimates made of world technological development either examined historically by dating the onset of written language and numbering systems (Baker, 1974) or predictively by projections for economic and scientific growth.

TABLE 2
BRAIN SIZE AND INTELLIGENCE

Measure	Orientals	Whites	Blacks
Intelligence Test Scores, IQ	107	100	85
Cranial Capacity, cc	1448	1408	1334
Brain Weight at Autopsy, gm	1351	1336	1286
Millions of "Excess Neurons"	8900	8650	8550
Brain Weight Decline Begins, yr.	35	25	?
Educational Achievement	1	2	3
Occupational Achievement	1	2	3
Current Socioeconomic Status Within the United States	1	2	3
Worldwide Historical Evidence	1.5	1.5	3
International Projections For Economic and Scientific Growth	1.5	1.5	3

SPEED OF MATURATION

In the United States, black babies have a shorter gestation period than white babies (Table 3). By week 39, 51% of Black children have been born while the figure for White children is 33%. Similar results have been obtained in Europe comparing women of European ancestry with women of African ancestry. Other observations find that black babies are physiologically more mature than white babies as measured, for example, by pulmonary function and amniotic fluid. Unfortunately I am unaware of data on Oriental babies.

Motoric development over the first three years also differentiates the races on many well standardized tests with measures made from birth to 12 months in coordination and head lifting, in muscular strength and rolling over, in locomotion, and at 15 to 20 months in ability to remove clothing. Typically, children of African descent are more advanced than children of European descent, while Oriental children are more delayed. Thus Oriental children typically do not walk until 13 months, compared to 12 months for white children and 11 months for black children.

TABLE 3
SPEED OF MATURATION

Measure	Oriental	Whites	Blacks
Gestation Period	?	2	1
Fetal Maturity	?	2	1
Skeletal Development at Birth	?	2	1
Head Lifting at 24 Hours	?	2	1
Muscular Development	3	2	1
Reaching and Eye-Hand Coordination at 2 Months	3	2	1
Turning Self Over at 3-5 Months	3	2	1
Age to Crawl	3	2	1
Age to Walk	3	2	1
Ability to Remove Clothing at 15 to 20 Months	3	2	1
Age of Puberty and First Sexual Intercourse	3	2	1
Age at First Pregnancy	3	2	1
Age at Death	3	2	1

Other life-cycle traits including age of first intercourse, and age of first pregnancy, as well as longevity, show a similar set of differences among the three populations.

SEXUALITY

Racial differences exist in the production of gametes (sperm and eggs). For example, the dizygotic twinning frequency per 1,000 births (caused by the production of two eggs at once) is 4 times in Mongoloids, 8 in Cauca-

TABLE 4
SEXUAL RESTRAINT

Measure	Oriental	Whites	Blacks
Gamete Production and Multiple Birthing	3	2	1
Speed of Menstrual Cycle	?	2	1
Speed of Sexual Maturation	?	2	1
Age of First Sexual Intercourse	3	2	1
Number of Premarital Partners	3	2	1
Frequency of Premarital Intercourse	3	2	1
Frequency of Sexual Fantasies	3	2	1
Frequency of Marital Intercourse	3	2	1
Number of Extramarital Partners	3	2	1
Permissive Attitudes, Low Guilt	3	2	1
Primary Sexual Characteristics (Size of Penis, Testis, Vulva, Vagina, Clitoris, Ovaries)	3	2	1
Secondary Sexual Characteristics (Salient Voice, Breasts, Buttocks, Muscles)	3	2	1
Biologic Control of Sexual Behavior (Periodicity of Sexual Response; Predictability of Sexual Life History From Age of Onset of Puberty)	3	2	1
Androgen Levels	3	2	1
Sexually Transmitted Diseases	3	2	1

soids, and 16 or more in Negroids, with some African populations having rates as high as 57 per 1,000.

Moreover, as summarized in Table 4, reviews of data collated from the Kinsey Institute for Sex Research and from around the world consistently show the same pattern on numerous other indices of reproductive effort including intercourse frequencies, reproductive speed, primary sexual characteristics, secondary sexual characteristics, and biologic control of behavior such as periodicity of sexual response (Rushton & Bogaert, 1987, 1988). Concomitant differences are observed in sexual attitudes and in sexually transmitted diseases including AIDS (Rushton & Bogaert, in press).

PERSONALITY AND TEMPERAMENT

Across ages, across traits, and across methods, the data support the hypothesis that, in terms of uninhibited temperament, Blacks > Whites > Orientals (Table 5). With infants and young children, observers' ratings are the main method employed, whereas with adults the use of standardized tests are more frequent.

TABLE 5
PERSONALITY AND TEMPERAMENT

Measure	Orientals	Whites	Blacks
Activity Level	3	2	1
Aggressiveness	3	2	1
Cautiousness	1	2	3
Dominance	3	2	1
Excitability	3	2	1
Impulsivity	3	2	1
Sociability	3	2	1

For example, a study carried out in French-language Québec examined 825 4- to 6-yr.-olds from 66 countries rated by 50 teachers. All the children were in preschool French-language immersion classes for immigrant children. Teachers consistently reported better social adjustment and less hostility-aggression from Mongoloid than from Caucasoid than from Negroid children (Tremblay & Baillargeon, 1984).

With adults, I recently aggregated the results from 25 countries using the *Eysenck Personality Questionnaire* (Rushton, 1985b) and found that 8 Oriental samples ($N = 4044$) were less sociable and more anxious than 30 Caucasoid samples ($N = 19,807$), who were less sociable and more anxious than 4 African samples ($N = 1906$).

SOCIAL ORGANIZATION

Stable social organization depends on following rules. This can be in-

dexed by marital functioning, mental durability, and by law abidingness (Table 6). On all of these measures the rank ordering within the North American population is Oriental > White > Black. The 1.5 million individuals of Oriental descent are very rarely perceived as a "social problem," for they have significantly fewer divorces, out-of-wedlock births, or incidences of child abuse than Whites, and, in fact, they are very seldom studied. Black family structure, however, has been studied intensively. Since the 1965 Moynihan Report documented the high rates of marital dissolution, frequent heading of families by women, and numerous illegitimate births, the figures cited as evidence for the instability of the black family have doubled, almost tripled in some areas (Staples, 1985).

TABLE 6
SOCIAL ORGANIZATION

Measure	Orientials	Whites	Blacks
Law Abidingness	1	2	3
Marital Stability	1	2	3
Parental Care	1	2	3
Mental Health	1	2	3
Accidents and Injuries	3	2	1
Physical Health	1	2	3

A similar pattern of Oriental < White < Black is gained from figures on those confined to mental institutions or who are otherwise unstable.

With respect to crime, in both North America and Western Europe, race is one of the best predictors, and quite possibly, in other parts of the world too (Wilson & Herrnstein, 1985). The Chinese and Japanese, whether assessed in their home countries, North America, or the United Kingdom, have a lower incidence of crime than do Europeans. African-descended people, while consisting of less than one-eighth of the population of the United States of America or of London, England, currently account for over 50% of the crime in both places. Since about the same proportion of victims say that their assailant was Black, the arrest statistics cannot be blamed on police prejudice.

r/K REPRODUCTIVE STRATEGIES

The ultimate aim of science is to explain causally the world around us rather than only to describe it. An evolutionary theory based on *r/K* reproductive strategies orders the data I have presented by directly linking brain size to gamete production and both to a suite of other life-histories characteristics (see Rushton, 1985a; following E. O. Wilson, 1975). The symbols *r* and *K* originate in the mathematics of population biology and refer to two ends of a continuum involving a trade off between egg production and pa-

rental care. As can be seen in Fig. 1, oysters, producing 500 million eggs a year, exemplify the r -strategy, while the great apes, producing only one infant every 5 or 6 years, exemplify the K -strategy. These reproductive strategies are correlated with other features of the organism's life history. These can be categorized into *Family Characteristics*, *Individual Characteristics*, and *Population and Social System Characteristics* (Table 7).

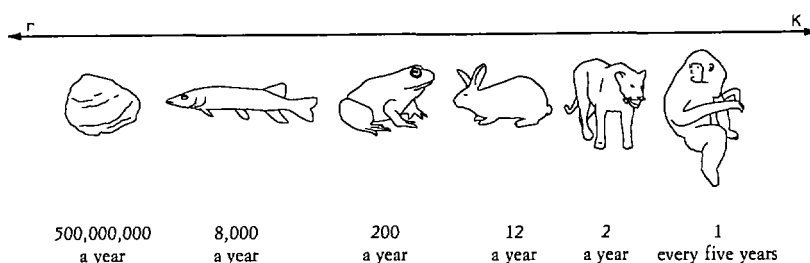


FIG. 1. The r/K continuum of reproductive strategies balancing egg output with parental care

Generalizing from the animal literature to human differences, the more K the family, the greater should be the spacing between births, the fewer the number of offspring, the lower the rate of infant mortality, the more sta-

TABLE 7
LIFE HISTORY DIFFERENCES BETWEEN r - AND K -STRATEGISTS

r -Strategist	K -Strategist
Family Characteristics	
Large Litter Size	Small Litter Size
Short Birth Spacing	Long Birth spacing
Many Offspring	Few Offspring
High Infant Mortality	Low Infant Mortality
Little Parental Care	Much Parental Care
Individual Characteristics	
Rapid Maturation	Slow Maturation
Early Sexual Reproduction	Delayed Sexual Reproduction
Short Life	Long Life
High Reproductive Effort	Low Reproductive Effort
High Energy Utilization	Efficient Energy Utilization
Low Intelligence	High Intelligence
Population Characteristics	
Opportunistic Exploiters	Consistent Exploiters
Dispersing Colonizers	Stable Occupiers
Variable Population Size	Stable Population Size
Lax Competition	Keen Competition
Social System Characteristics	
Low Social Organization	High Social Organization
Low Altruism	High Altruism

ble the family system, and the better developed the parental care. The more *K* the person, the longer should be the period of gestation, the higher the birthweight, the more delayed the onset of sexual activity, the older the age at first reproduction, the longer the life, the more physiologically efficient the use of energy, the higher the intelligence, the more social-rule-following the behavior, and the greater the altruism. Thus, diverse organismic characteristics, not otherwise relatable, are presumed to covary along a single dimension.

Because the races differ on many of the *K* characteristics, it is hypothesized that Mongoloids are more *K*-selected than Caucasoids who in turn are more *K*-selected than Negroids. Thus the racial differences in behavior may belong in a broader evolutionary context than has been considered to date.

But why would Orientals have ended up the most *K*? As mentioned, genetic distance studies based on DNA sequencing show that modern humans evolved in Africa about 200,000 years ago and subsequently migrated northward to other parts of the globe, with an African-non-African split occurring 110,000 years ago and a Caucasoid-Mongoloid split occurring 41,000 years ago. It seems reasonable to postulate that as populations moved north they encountered more challenging environments, including the last ice age which ended just 12,000 years ago, and thus the more stringent were the selection pressures for intelligence, forward planning, and sexual and personal restraint. The Siberian cold experienced by Mongoloid populations was more severe than even that experienced by other pale skinned populations in Northern Europe.

GENES OR ENVIRONMENT?

It is possible to argue that many of the observed correlations are due to purely cultural modes of transmission. The Chinese and Japanese, for example, are known to come from intact family backgrounds where there are strong socialization pressures to conform and where restraint and tradition are valued. The opposite pattern of results may then be expected from Blacks who often come from less well integrated family systems and who are undersocialized for achievement. However, the physiological data on the rate of maturation, the size of the brain, and the production of gametes, as well as the evidence on the cross-cultural consistency of the racial patterns, suggest that genetic and evolutionary influences may also have a role to play.

Although purely environmental explanations are unparsimonious, it is useful to consider more explicitly the heritability of the racial group differences (Rushton, in press b). For example, preliminary evidence from a longitudinal adoption study by Scarr, Weinberg, and Gargiulo (1987) found that after 17 years Black children adopted into White middle-class families do not resemble the White siblings with whom they have been raised. When the

children were 7 years of age, the results showed that the Black IQ was comparable to White IQ, but a 10-yr. follow-up showed that Black IQ and educational achievement significantly declined while social deviance and psychopathology increased. Thus Black children have regressed to their population mean on these traits.

Perhaps even more decisively, a number of studies have shown that the racial group differences are most pronounced on the more genetically influenced components of traits, i.e., positive correlations have been found between a subtest's heritability and the degree to which it differentiates the races. This is a *differential* prediction: A positive correlation is expected only if the racial-group differences are due to the genes; if the differences are due to environmental factors, the correlation would be negative.

DISCUSSION

The issue arises as to whether, in some way or another, one race has "evolved more." Fig. 1 seems to imply a move from simple *r*-type animals producing thousands of eggs but providing no parental care to more complex *K*-type animals producing very few offspring but providing lavish parental care over a long life span. Although it has become unfashionable to view man as the "most developed" of species, this once traditional view gains novel support from the perspective of an *r/K* dimension. As E. O. Wilson (1975) put it: "In general, higher forms of social evolution should be favored by *K* selection" (p. 101).

John Bonner (1980) in a book entitled *The Evolution of Culture in Animals* has shown that the later the emergence of an animal group in earth history, the larger is its brain size, and the greater is its culture. With humans, as mentioned, it is the most recently emerged Oriental populations who have the largest brains and have the highest IQ scores. This suggests a continuity from the animal to the human literature.

If the analysis presented here is correct, then two important predictions can be made about the course of world history. First, with respect to economic and scientific achievements, the Oriental populations of the Pacific Rim must be expected to continue to grow in accomplishments until they eventually outdistance the predominantly Caucasian populations of North America and Western Europe. As Steen (1987) showed in her recent article in *Science*, Orientals within the United States have already begun to do this in mathematical performance.

Second, on a most sober topic, with respect to the AIDS pandemic, whereas *K*-selected populations such as the Orientals have epigenetic rules which provide protection from HIV infection (due, for example, to their sexual and temperamental restraint), *r*-selected populations such as Africans are especially at risk (most obviously because they will be drawn to have sexual

intercourse with more numerous partners, even when they are married). The pattern of Whites being intermediate to Blacks and Orientals in HIV seroprevalence already occurs within the United States as it also does internationally (Rushton & Bogaert, in press).

There are two final points that I should like to make before concluding. First, in any analysis of the kind presented here, it must be emphasized that there is enormous variability *within* each population. Since these distributions overlap, it is always problematic to generalize from a group average to any particular individual. Second, recall from Table 1 that only 50% of the variance is genetic and that 50% is due to the environment. Even the genetic effects are *necessarily* mediated by neuroendocrine and psychosocial mechanisms, thus allowing opportunity for intervention and the alleviation of suffering.

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