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The Status of the Race Concept in Physical Anthropology

There are hereditary differences among human beings. Some of these differences have geographical correlates. Some genetic variants that produce physical or behavioral deficits occur significantly more often in some areas, or in some ethnic groups, than in others. However, none of these facts provides any intellectual support for the race concept, for racial classifications, or for social hierarchies based on ethnic-group membership.

The geographical element of the race concept is important in theory but is widely ignored in practice since it does not conform well to the facts of current human phenotype distribution. Much of the literature on supposed racial differences involves such geographically meaningless exercises as studying differences among "races" by subdividing a sample of North Americans. If races are defined as geographically delimited conspecific populations characterized by distinctive regional phenotypes, then human races do not exist now and have not existed for centuries. [*race, human variation, intelligence*]

The concept of race is a divisive and emotionally charged topic among physical anthropologists. The history of the American Association of Physical Anthropologists' "Statement on Biological Aspects of Race" (AAPA 1996) attests to our divisions on this issue. The AAPA statement had its inception at the 1989 meetings of the American Association for the Advancement of Science, where the Canadian psychologist J. Philippe Rushton was invited to deliver a talk on his notorious racial theories (Rushton and Bogaert 1989). Some physical anthropologists who happened to be present were appalled to hear Rushton's views propounded under the auspices of the AAAS. They felt that physical anthropologists, as the supposed scientific experts on matters of race, ought to have been consulted before Rushton was given a platform. Convinced by this incident that it was high time for physical anthropologists to take an official stand against scientific racism, they asked the Executive Committee of the American Association of Physical Anthropologists to establish a committee to work toward that end.

A working group set up under the direction of Sol Katz, the AAPA's representative to the AAAS, submitted a draft statement on race in 1992 to the AAPA Executive Committee (Sirianni 1992). The Executive Committee revised it further and passed it along for approval to the Association's business meeting in Toronto in 1993. The statement was rejected by a vote of 43 to 35, with 4 abstentions (Sirianni 1993). Nevertheless, the AAPA executive was given permission to rewrite the statement and dis-

seminate the revision in the name of the Association. After three years of additional discussion, debate, and revision, the statement was finally approved by the Executive Committee and published in the December 1996 issue of the *American Journal of Physical Anthropology* (AJPA).

Some AAPA members who spoke against the race statement in Toronto were opposed to it on philosophical grounds. The AAPA, they argued, simply had no business making pronouncements of this sort. If the issues being dealt with were matters of scientific fact, they should be thrashed out in the scientific literature, not settled by passing resolutions at meetings. It was no more appropriate for the AAPA to have an official position on the facts of human racial variation, these people insisted, than it would be for it to have an official position on the phylogeny of marmosets, or the diagnostic skeletal signs of syphilis, or any other factual issue. And if the issues in question were matters not of fact but of politics and morality, then physical anthropologists could say nothing more authoritative about them than anyone else.

Although these objections to the "Statement on Biological Aspects of Race" had nothing to do with the issue of race as such, the rejection of that statement at the 1993 AAPA business meeting also reflected substantive disagreements about race among biological anthropologists.¹ Some of us, myself included, regard human races as oversimplified or nonsensical constructs (Brace 1964, 1996; Goodman and Armelagos 1996; Harrison et al. 1977; Keita and Kittles 1997; Livingstone 1962; Marks 1995; Molnar 1992; Montagu 1942a, 1942b). Others think that

racess are real biological entities. In a 1985 survey, 365 physical anthropologists were asked whether they agreed with the statement, "There are biological races within the species *Homo sapiens*." Almost half of them ($N = 181$) said they did. Almost as many ($N = 148$) said they did not (Lieberman and Reynolds 1996).

A similar 1978 survey, which revealed a similar difference of opinion, showed that the positions that physical anthropologists take on these issues tend to correlate with their social status and cultural background (Lieberman and Reynolds 1978). Scientists' attitudes toward the race concept are probably also correlated to some degree with their politics. Experience suggests that (as might be expected) physical anthropologists who reject the concept of race tend to lean more to the political left than their opponents do. But the division between the two camps is not really a split between tender-minded liberal egalitarians and tough-minded conservative elitists. To a surprising extent, physical anthropologists in both camps make similar assertions, cite similar sources, and express similar fervent opposition to racist practices and beliefs. The difference between them is mainly one of emphasis. The findings that one group admits grudgingly and seeks out reasons for disregarding are spotlighted by the other group as the central facts that reveal the way things really are. There is a case to be made for each side, and it is not hard to find physical anthropologists who have questioned the existence of races in one publication but have used racial categories to structure their data in another.

The Case for the Race Concept

Those who defend racial taxonomies generally say they are just one way of expressing the generally recognized fact that human genetic variation is correlated with geography. For example, most of the world's people who have very dark skin and woolly-textured, tightly curled hair live in Africa south of the Tropic of Cancer. Although many people who live elsewhere also meet this description, the great majority of them are descended from people who lived in sub-Saharan Africa. In some parts of the world, immigrants from tropical Africa have simply disappeared into the general population through interbreeding, but in other areas—for instance, in North America—they have formed persistent ethnic groups with distinctive cultural traditions and a tendency toward preferential mating within the group. Within such ethnic groups, assortative mating has maintained high frequencies of a recognizably "African" facial appearance and of genetic variants that occur with high frequencies in equatorial African populations (for example, the hemoglobin-S mutation associated with sickle-cell disease). Defenders of racial taxonomy argue that it is not unreasonable to think of such groups as African-derived breeding populations, or to distinguish them with labels like "African American" that reflect their

African ancestry, or to lump them together for some purposes with their parent populations in Africa as constituting a "Negroid" group.

Proponents of the race concept acknowledge that racial classifications can be used to discriminate against people. But because such classifications reflect certain facts of human biology, they can also be used justly and fairly to serve benign ends. For example, doctors need to be alerted to the elevated probability of sickle-cell disease in patients of equatorial African ancestry. Forensic anthropologists may be asked by the police to provide racial identifications to help in solving crimes—say, to determine whether a skeleton found in the woods could be that of an African American murder victim. Because there are some skeletal traits that occur more frequently among some North American ethnic groups than among others, it is sometimes possible to answer such questions with a fair degree of confidence. And because racially defined ethnic groupings are real and important elements in American culture, we often need to recognize such groupings in investigating the interaction between culture and biology. For instance, if we wish to determine whether Black children have been systematically exposed to higher environmental lead levels than Whites, we need to structure our sample in terms of race (Schell 1997).

The Case against the Race Concept

Biological anthropologists who deny the value of racial typology would grant all these points, but would insist that racial categories are nevertheless biologically incoherent and heuristically misleading. As one classic textbook of human biology expressed it two decades ago, "Classifications of man into Mongoloids, Caucasoids, Negroids, etc. undoubtedly express certain genuine features of human variation but they do so in a crude and misleading way" (Harrison et al. 1977:184).

Proponents of the race concept usually define races in terms of the typical or average properties of regional human populations, as though racial categories were geographically delimited biological subspecies. Summarizing the definitions of "race" proposed by proponents of human racial classifications over the past half-century, Molnar (1992:23) notes that all such definitions stress the concept of races as geographical entities: "Primarily, the divisions are based on the sharing of a common territory or space and [assume] that geography played some role in establishing boundaries until recent times."

But this is not how the concept of race is in fact employed in either common usage or the scientific literature. Geography has little to do with the race concept in its actual application. Studies of "racial" differences often draw their data from so-called Black, White, and Asian individuals born in the same geographical region. For example, much of the published literature on supposed racial

differences in "intelligence" is based on data sampled from native-born North Americans identified as representatives of different races.

If North American "Blacks," "Whites," "Asian-Americans," "Amerindians," and so on are racially different, then (since all these people inhabit the same geographical region) *races are not geographically distinct*. And if these people are not racially different, then (since the range of their combined phenotypes encompasses roughly the whole range of variation in the human species) *races are not phenotypically distinctive*. Therefore—unless we decide to leave the modern populations of at least Australia, North and South Africa, Oceania, large parts of Eurasia, and the entire Western Hemisphere out of the human picture—definitions of races as geographically delimited populations marked by distinctive phenotypes cannot correspond to any current reality.

When advocates of racial taxonomy try to take these facts into account, the results are predictably incoherent. For example, in their classic textbook on race, Coon et al. (1950) tried to deal with the modern populations of North America by recognizing a "primary human race" (!) called "North American Colored," which "includes all forms from Forest Negro to the borderline of White, with all possible combinations. . . . American Indian is a third genetic element in the mixture. . . . For purposes of racial taxonomy it might more reasonably be subdivided into Negro and Mulatto, with the least Negroid extreme included with the Northwest European Whites, into which body many of its numbers have already been assimilated" (p. 131).

Obviously, a classificatory unit defined in these strained and nebulous terms is not delimited by either geography or genetics, and has no taxonomic utility or biological meaning. Indeed, some proponents of racial classification grant that such "racial" groups as "North American Colored" are biologically meaningless. "Most human populations today," writes Shipman (1994:B-1), "are the result of a delightful and thorough admixture of genes from many different groups. Even those with strong ethnic identities are often a genetic mixture, including the erroneously labeled 'race' of African Americans. . . . African Americans are not a race." But the same reasoning applies to other ethnic groups of North America, including "Whites," "Asian Americans," and "Native Americans." It applies as well to similar groups in other regions that have experienced large-scale immigration from outside over the course of the past 300 years. When all these parts of the world are omitted from our racial classifications, there is not much left to classify.

More commonly, advocates of racial typologies try to leave most of the inconvenient facts about modern human populations out of the picture. Such proponents grant that races are less distinct than they used to be, but insist that "geography played some role in establishing boundaries until recent times." The idea here is that racial phenotypes

were pretty well correlated with geography (with Negroids restricted to Africa, Caucasoids to western Eurasia, Mongoloids to eastern Asia, and so on) until the era of European colonialism, when massive population movements both voluntary (like the colonization of South Africa by Dutch settlers) and forced (like the initial colonization of the Americas by enslaved Africans, or of Australia by deported English convicts) brought different races together in various parts of the world and produced racially mixed populations that are not easy to classify. This artificially induced and unnatural commingling of different races has muddied the original picture, but enough of the human species remains in a relatively pristine condition to enable us to reconstruct the original situation by studying "primitive isolates" today in uncolonized parts of the world like Amazonia, the Ituri rain forest, and Lapland. Or so the story goes.

It is true that human populations in some parts of the world were more uniform and distinctive a thousand years ago than they are at present. But populations like those of modern North America, with high levels of phenotypic variability maintained partly by migration and gene flow from elsewhere, are not a new phenomenon. Similar populations have inhabited northern and southern Africa and much of western, central, and southern Asia for centuries or millennia. It would have been just as futile an exercise to try to apply racial typologies to the highly variable people of Egypt or India four thousand years ago as it is to do so in the United States today. In such populations, "racial" types are polymorphic, like ABO blood-group phenotypes. It makes no more sense to classify the individuals comprising these populations into racial categories based on epidermal pigmentation, hair texture, or nose, lip, and eyelid shape (the traits that loom largest in our racial typologies, probably because they are all visible in people's faces) than it would to separate them into races on the basis of their ABO phenotypes. In fact, it makes even less sense, since ABO phenotypes are discrete, whereas "racial" types in such populations are highly variable and intergrade imperceptibly with each other.

There are of course things to be learned about human adaptations by trying to reconstruct the past distributions of human phenotypes. Skin pigmentation furnishes a familiar example. The darkness of human skin in the Old World appears to be inversely correlated with distance from the equator. Populations that deviate from this general pattern can plausibly be interpreted as recent migrants from higher to lower latitudes, or vice versa (Brace 1996). The pattern probably reflects a long history of low-level natural selection favoring dark skin in areas of high year-round insolation. We might not discern this pattern so easily if we used modern data uncritically and pretended not to know that the presence of large numbers of pink-skinned people in the Transvaal and of black-skinned people in Canada is a relatively recent phenomenon.

But there are also things we can learn about human adaptations by looking at modern phenotype distributions. European colonies were established throughout most of the world during the eighteenth and nineteenth centuries. In temperate-zone areas—Australia, New Zealand, North America, southern South America, and South Africa—these colonies tended to expand and supplant or supplement the indigenous peoples; in tropical areas, they generally made less of an impact. Crosby (1986) suggests that this differential success reflects European cultural adaptation to temperate-zone ecologies. However, it might also reflect patterns of selection against European phenotypes in equatorial climates. Perhaps pink-skinned variants of *Homo sapiens* do not thrive in areas of high year-round insolation. To test this thesis, we need to look at recent populations, not at our reconstructions of populations that lived a thousand years ago. Both past and present distributions provide biological data on human adaptations and microevolution. It is a mistake to think that today's human populations are somehow unreal, unnatural, or corrupted, or that modern technology has freed them from selection pressures.

No matter whether we look at past or at present-day populations, the use of racial categories in structuring our samples hinders, not helps, our efforts to describe human variation and explain its causes. If we want to frame or test hypotheses about the adaptive significance of skin color, the appropriate question to ask is not, "Do Negroids do better than Caucasoids in some environments?" but rather, "Do dark-skinned people do better than light-skinned people in some environments?" Since there is considerable variation within, and overlap between, "Negroids" and "Caucasoids" with respect to skin color, analyzing the variation in terms of racial categories serves only to blur the question and introduce irrelevant variables into the data.

Similar criticisms apply to any attempt to use racial categories in describing or analyzing human genetic variation. Since there are thousands of separate, independently assorting variable loci in the human genome, it is highly unlikely *a priori* that variation at any particular locus will covary with any other. We would therefore expect on theoretical grounds that a descriptive classification based on a small number of "racial" traits would be of little use in summarizing the variation that occurs at any or all of the other variable loci in the human genome. Empirical studies bear out this expectation. Even if we try to backdate the evidence to A.D. 1500 by restricting our data base to supposedly isolated aboriginal populations, the geographic patterns of variation at most loci do not fit our racial typologies. In the case of the ABO system, for example, the A allele reaches its highest frequencies in southern Australia, Europe, northeastern Asia, and the Arctic fringes of North America; the B allele in central Asia and West Africa; and the O allele in the New World,

New Guinea, and northern Australia (Cavalli-Sforza 1996:171–173). Other genetic loci generally show patterns that are discordant with racial typologies, ABO allele distributions, and/or each other. These facts underlie Lewontin's often-quoted (1972) conclusion that "only 6.3% of human diversity [is] attributable to race," and that there is more genetic variation within "racial" groupings than there is between them (cf. Templeton, this issue).

Are There Trends in the Use of the Race Concept?

The debate between biological anthropologists who defend the concept of race and those who deplore it has been going on for over half a century (Barkan 1992). It is not clear whether this debate is moving toward a resolution. Different observers have different perceptions of the changing importance of the race concept. Some think that the use of racial categories and concepts is a vanishing relic of outmoded and discredited ways of thought in biological anthropology (Landau 1997; Sanjek 1994), whereas others discern a recent resurgence of the race concept in skeletal biology, forensic anthropology, paleoanthropology, nutritional studies, and human genetics (Goodman and Armelagos 1996; Lieberman and Jackson 1995).

As far as I know, the only empirical study bearing on these claims was undertaken by Littlefield et al. (1982), who concluded that the 1970s had witnessed a sudden and widespread abandonment of racial classification in textbook presentations of human biology. To try to assess similar trends in the primary scientific literature, I undertook a survey of the research articles published in the APA's official journal, the *American Journal of Physical Anthropology*, from 1965 to 1996. I surveyed the odd-numbered years plus the 12 issues from 1996 (the most recent complete annual file at the time of this writing). Of the 1,749 scientific articles contained in these 17 annual files, 810 (46%) dealt with some aspect of modern human variation and therefore might potentially have used racial categories. I divided these 810 articles into those that utilized racial categories, either in structuring the sample or analyzing the data, and those that did not. Papers were scored as not involving racial categories if their human subjects were grouped into classes defined strictly in terms of geography ("Lithuanians"), genotype ("hemoglobin-S homozygotes"), phenotype ("obese people"), ethnic self-identification ("Amish"), or any combination of such criteria. "Racial categories," as defined here, include traditional racial taxa ("Australoids"), self-contradictory geographical descriptions ("Australian Europeans"), ethnic identifications inferred by the researcher by just looking at people, and any groupings defined in terms of supposed historical origins rather than observable characteristics. The following are examples of racial categories

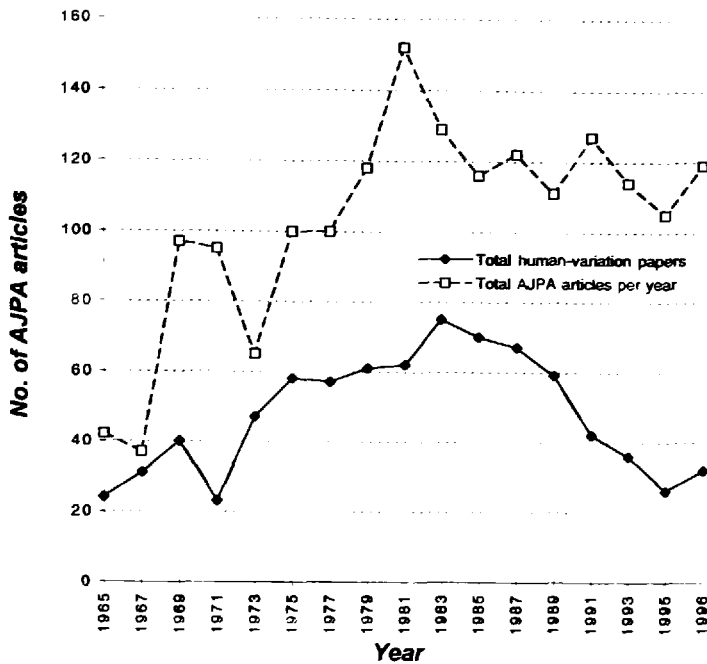


Figure 1. Annual publication rates in the *American Journal of Physical Anthropology*, 1965–1996. White squares signify total scientific articles, and black diamonds, total articles on modern human variation.

found in these 810 papers: “Typical Mongoloid and Negroid collectives,” “American Japanese males,” “(American) subjects primarily of African origin,” “Full-blooded Papago Indians,” and “Australians of pure Aboriginal ancestry.” Some papers could have been scored either way, and a different observer would no doubt come up with somewhat different definitions and numbers, but the standards used here were at any rate applied fairly consistently.

In the sampled years, the number of articles about modern human variation published annually in the *AJPA* rose almost every year from 1965 to 1983. Since then, it has declined steadily. This rise and fall partly reflects a parallel but more erratic fluctuation in the number of articles on all subjects published annually in the *AJPA* (Figure 1). But even when we correct for this by expressing the number of articles on human variation as a percentage of total *AJPA* articles published in each sampled year, there still appears to have been a long-term decline in the percentage of the *AJPA* devoted to the topic of modern human variation (Figure 2). This might be interpreted as betokening a decreasing interest in the whole subject of “race” broadly defined. However, it might also reflect the proliferation of new journals that provide alternative publication venues for articles on human biology and genetics.

Of the 810 articles on modern human variation published in the *AJPA* during the years sampled, 40.5% utilized racial categories. The annual tally of racial-category articles as a percentage of all human-variation articles fluctuates widely around a near-identical mean of

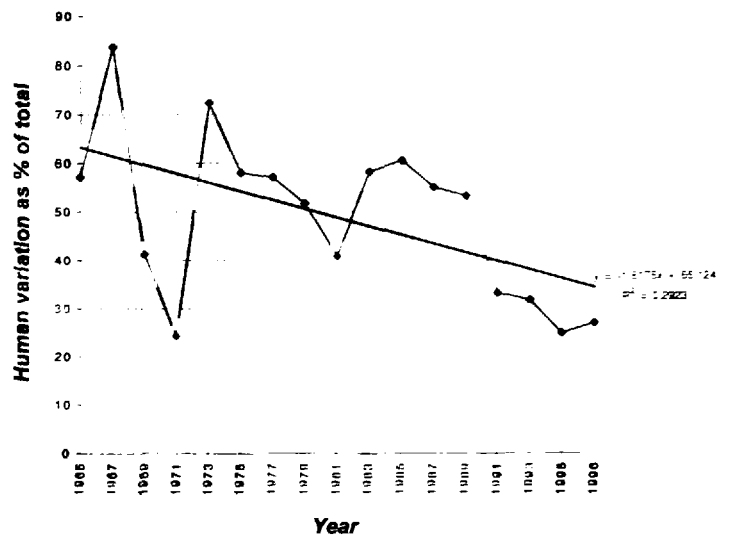


Figure 2. Papers on variation in modern human populations, as a percentage of total *AJPA* articles, 1965–1996. The least-squares line trends downward, although the correlation is not significant ($R^2 = 0.292$).

40.67%, with a standard deviation of 11.45%. There is no discernible trend in these percentages (Figure 3).

In summary, the role played by racial taxonomy in the study of modern human variation has apparently changed little or not at all over the course of the past 30 years. In the 1990s, as in the 1960s, most researchers studying human variation do not make use of the concept of race in gathering and analyzing their data; however, a consistently large minority continue to do so. These figures suggest that

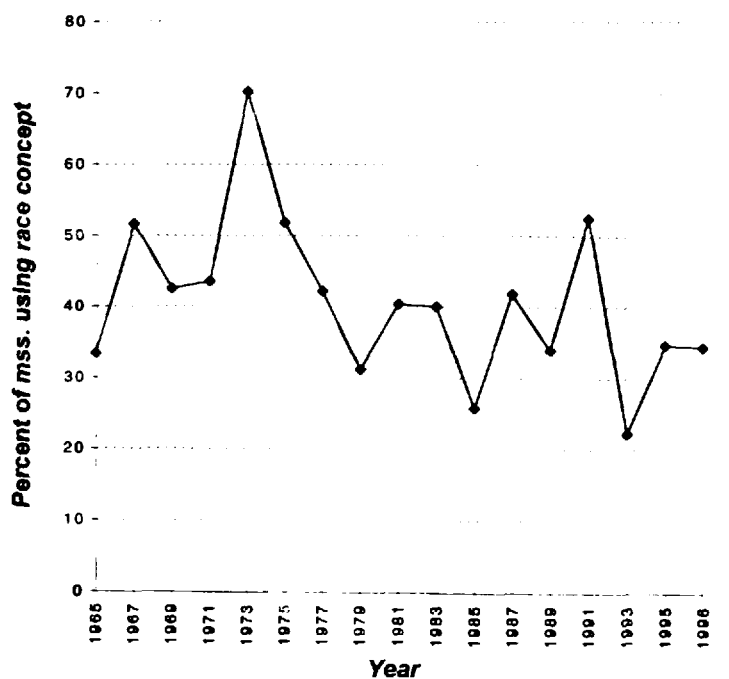


Figure 3. Use of racial classifications in analyzing or structuring data in *AJPA* articles on modern human variation, 1965–1996. No trend is discernible over this 32-year period.

neither the proponents nor the opponents of racial classification have any grounds for thinking that history is on their side.

Biological Determinism, Biological Superiority, and Race

Although physical anthropologists are divided over the concept of race, they share a general conviction that human behavior is significantly channeled, constrained, and determined in various ways by human biology. This conviction is not universally shared by anthropologists in other subfields. I suspect that many social and cultural anthropologists would dismiss this idea as politically motivated "biological determinism." Some seem to regard any claims about human biology as racist or elitist, and to think of eugenics and *The Bell Curve* (Herrnstein and Murray 1994) whenever they hear people talk about human behavior in the same breath as biology or genetics.

There are some good historical reasons for these associations. Throughout Western history, the wealthy and powerful have found it comfortable and expedient to overestimate the importance of heredity in explaining the differences between people, in order to try to reassure themselves and persuade others that the prevailing social inequalities are just and natural. In most or all complex societies, the ascription of social status has been to some degree hereditary, and membership in low-status classes or castes has been widely regarded as a matter of simple inheritance, as though poverty, ignorance, and powerlessness were dominant alleles at single genetic loci. Such practices and assumptions have never been more broadly applied, more widely accepted, more strongly upheld by mistaken scientific expertise, and more productive of misery, injustice, and evil than in the case of the concept of biological race. Physical anthropology has in the past provided more intellectual support for this concept and its attendant evils than many of its present practitioners realize or care to remember (Blakey 1994, 1996; Marks 1995; Montagu 1942b; Wolpoff and Caspari 1997). Much of the animus that attaches to the concept of race among physical anthropologists stems from its shameful history.

Still, I think that the current widespread suspicions concerning biological concepts in anthropology involve some misapprehensions. In what follows, I hope to persuade some skeptical colleagues in other subfields of anthropology that admitting the reality and significance of hereditary biological differences between individuals does not compel us to think that races are real biological entities, or to believe that the rich are wealthy because of their superior genes. If we can arrive at a consensus on these points, perhaps we can agree at a minimum that "biological anthropology" is not a contradiction in terms.

People are animals. As such, we face the same fundamental biological constraints on our lives as other ani-

mals. To live, we need to breathe, assimilate food, and excrete wastes. If we stop doing any of these things, we die. Eventually we die anyway, no matter what we do. Like other sorts of animals, we also face particular, species-specific biological constraints. Salmon can breathe water but cannot learn to play the piano. The reverse is true of most human beings. Cultural innovations may someday enable us to evade our present biological constraints, but at the moment we are stuck with them.

People also face environmental constraints on their lives. Although many of these are beyond human control, a lot of them are imposed on us by other people. Most of us could be richer, wiser, kinder, more accomplished, healthier, and happier than we are if only we had spent our lives in different environments. Almost every sort of human potential is limited by both environmental and biological factors. I cannot learn everything there is to learn because my brain and my lifespan are finite. This is a fact of human biology, which would be true in any environment currently attainable. But by the time I die, I will have learned even less than I might have given my brain and lifespan, because of my choices and because of the constraints placed on me by my environment. This is true for all people, no matter what their hereditary capacities are.

I hope that we can all agree that these are simple, obvious truths about the human condition. (They are also truths about the salmon condition, the horse condition, and so on.) It follows that it makes no sense to ask whether a particular capacity is *in principle* limited chiefly by heredity or by environment. Everything is in principle 100% limited by both heredity *and* environment. The life of a concert pianist must begin with a fertilized human ovum; an opossum ovum will not suffice, because of its biological limitations. On the other hand, no matter what sort of a human ovum we start with, it cannot develop into a concert pianist in most environments—say, in Europe in 10,000 B.C., or in the womb of an opossum, or in a 10% solution of formaldehyde. Asking whether piano-playing skill is primarily determined by heredity or by environment is therefore meaningless. The relative importance of heredity and environment in producing the observed differences between people in this or any other trait depends on the relative variabilities of the two factors in any particular situation. If all people were raised in identical environments, any differences among them not due to their own choices would obviously be due to heredity. If they were genetically identical, all such differences would be due to environmental factors.

In the world as it is today, it seems clear that some of the differences between people (say, the differences between an infant with Tay-Sachs disease and its parents) are almost entirely determined by genetic factors. Others (say, the differences between political liberals and conservatives) are as far as we know determined almost entirely by environment and individual choices. Yet others (e.g.,

piano-playing ability) are probably determined by combinations of, or interactions among environment, heredity, and choice. Although scientists often try to estimate the relative contributions of these factors to the observed variation in various human traits, we need to remember that such estimates are themselves dependent on environmental variables. Some people believe that they can evaluate the relative contributions of environmental and genetic factors to a trait by comparing that trait's variation among identical twins (who are clones of each other) with its variation among fraternal twins (who are genetically different). But even this approach does not really allow us to factor out environmental influences altogether, because *the environment determines the extent to which a given trait is influenced by genetic factors*. For example, in a cultural context where (say) redheaded people were stereotyped as stupid and ineducable and were accordingly neglected by their teachers, we would expect identical twins to resemble each other more closely in their educational attainments than fraternal twins, simply because identical twins are more likely to have the same hair color than fraternal twins are. In such an environment, success in school might be causally linked with genetic factors that would not affect educational attainment in other environments.

Because the degree to which any trait is genetically conditioned depends on environmental circumstances, there is no such thing as "heritability" in the abstract. To quote Weizmann et al. (1996:192–193), "Heritabilities depend on the specific genetic composition of the population and the environmental circumstances experienced by that population. . . . [They] cannot be generalized to other populations or other environmental conditions."

What is true of heritability is also true of fitness. The theory of natural selection entails that within any species, some genetic variants are more fit than others—that is, there are nonrandom factors that make certain variants more likely than others to leave copies in the gene pools of succeeding generations. Not all evolutionary change is driven by natural selection, and it is not always easy to distinguish variants favored by selection from those that prosper due to mere coincidence. For example, average human skin pigmentation may well have decreased from the seventeenth through the nineteenth centuries A.D. as a side effect of the great expansions and emigrations of light-skinned European populations during the era of colonialism. At the moment, human pigmentation may be on the upswing again due to higher population growth rates in the tropical countries of Africa, Asia, and the Americas, where average skin color is darker than it is in Europe. There is no reason to suspect that these historical fluctuations reflect changing patterns of natural selection on human skin color.

Genetic variants favored by natural selection can be properly described as biologically superior to others. But such variants are superior only in relation to a specific en-

vironmental context, including the species itself, its population structure, and its relationship to and interactions with all aspects of its circumstances. Again, there is no such thing as generalized fitness in the abstract. For example, lizards born without limbs are generally at a disadvantage, but there have been situations in the past where this was not the case—which is why there are snakes and limbless lizards in the world today. Likewise, people who are born without limbs are generally at a disadvantage; but we can imagine or create environments where they are just as fit as anyone else, or even more so.

Our culture leads us to regard mental abilities as the most important markers of human status. Both our cultural traditions and our own professions as scholars and teachers encourage us to lump all mental abilities together as a single variable called "intelligence," to equate high "intelligence" with biological superiority, and to feel that people with exceptional mental abilities somehow deserve to be at the top of the heap. When a man with a crippled body becomes a great astrophysicist, we are awed and inspired by his example. When an illiterate, inarticulate, and unreflective man becomes a great boxer, we are less impressed. If the stupid prizefighter makes ten times as much money in the course of a year as the crippled astrophysicist, we regard it as a scandal. Because intellectuals tend to value other skillful manipulators of symbols more highly than they value skillful boxers, gardeners, hunters, or masons, most of the published debate concerning the supposed biological superiority of certain human populations has centered around the issue of congenital average differences in "intelligence" between "races." While nobody gets very excited if scientists suggest that Swedes are on the average taller than Japanese for genetic reasons, everybody gets hot under the collar whenever someone claims that Swedes are on the average smarter than Nigerians for genetic reasons. The difference between the two responses is due in part to the fact that "intelligence" is a notoriously dubious variable, which is far less clearly defined and less easily quantified than "height." But at a deeper level, the difference reflects the different cultural values that we attach to stature and IQ.

However we choose to define or subdivide "intelligence," it is an unpleasant fact that some genetic variants make their possessors stupider than other people: that is, they result in impaired mental abilities in all currently attainable human environments. Some of these genes are known to be significantly more common in some human populations and ethnic groups than in others. These two facts suggest (but do not prove) that human populations and ethnic groups may well differ congenitally in average mental potential at birth. This conclusion sounds shocking. However, even if it is true, it turns out to be far more innocuous and less interesting than either racists or egalitarians assume.

The example of Tay-Sachs disease will show why this is so. Central and Eastern European Jews—Ashkenazim—historically tended to marry and mate mainly within their own ethnic group. Endogamous mating within a relatively small local population like this can be expected to reduce genetic diversity. In such situations, damaging genetic variants may by sheer chance accumulate and proliferate more rapidly than they are being removed by natural selection. This appears to have happened in the Ashkenazic population. One such variant that occurs in elevated frequencies in Ashkenazim is an ugly recessive lethal mutation that produces a disorder variously called infantile amaurotic family idiocy, cerebral sphingolipidosis, type I GM₂ gangliosidosis, or Tay-Sachs disease. Heterozygotes for this mutation (children who inherit it from one parent, but not from the other) are perfectly normal. But homozygotes (children who inherit it from both parents) never grow up. In such children, toxic fatty-acid compounds accumulate in the tissues of the nervous system, producing nerve-cell degeneration, blindness, paralysis, and early death (Ampola 1982; Volk 1964).

The Tay-Sachs mutation is significantly more common among people of Ashkenazic ancestry than it is among other Central and Eastern Europeans (Aronson 1964). It might well prove to be the case that, when all the Tay-Sachs homozygotes are counted into the picture, the average genetic potential for various mental abilities is lower at birth among Ashkenazim than it is among non-Jews from the same area. I do not know whether this is in fact true, and I am not particularly anxious to find out, because the answer would be socially and politically uninteresting. Even if Ashkenazim have on the average lower intelligence than their neighbors, that would not imply that any particular member of the group—say, Albert Einstein—is mentally defective. Congenital mental deficiency is not caused by belonging to an ethnic group that has a lot of congenitally stupid people in it. It is caused by carrying certain combinations of genes in certain environments.

Again, that last phrase needs to be stressed. Because no gene acts independently of its environment, genetic variants that affect mental abilities in one setting may have no effect in other environments. The metabolic disease called phenylketonuria illustrates this rule. Like Tay-Sachs disease, this disorder is caused by a recessive allele. People who are homozygous for this allele cannot properly metabolize the amino acid phenylalanine. If they ingest it, toxic compounds accumulate in their tissues and cause neurological damage, resulting in epilepsy and mental retardation. However, such people can avoid this fate simply by avoiding phenylalanine. If they adhere to a suitably restricted diet from birth onward, they suffer little or no damage (Ampola 1982; Kaiser and Bickel 1971; Williamson et al. 1971). In environments where phenylketonurians are unable or unprepared to avoid phenylalanine, the genetic locus of the phenylketonuria mutation

represents a “gene for intelligence.” In other environments, it does not. Our science and technology enable us to create favorable environments in which phenylketonuria becomes a relatively harmless genetic variant. Someday, we may be able to create environments in which Tay-Sachs homozygotes, or other sorts of so-called “congenital mental defectives,” are not handicapped. As we alter our environments in pursuit of such aims, the contribution of genetic variation to variation in human mental abilities will decline accordingly.

I suspect that the question of interethnic differences in average mental abilities attracts more attention than it deserves because some of the people who write about it and ought to know better are not really thinking about heredity in terms of particulate Mendelian inheritance. Rather, they are thinking about it in terms of our folk concepts of “blood” heredity. Suppose for the sake of argument that, say, the inhabitants of Ireland make lower average scores on IQ tests than the inhabitants of Scotland. Average genetic differences between the two populations might well be contributing to that difference in test results. But even if all this were true, it would not imply that Irish “blood” represents some sort of a hereditary taint that dooms all those of Irish descent to some degree of congenital thick-headedness. It might simply mean that, say, the phenylketonuria mutation occurs in higher frequencies in Ireland than in Scotland. Any genetically conditioned difference in average mental abilities between two human groups will fit this general description.

As the theory of natural selection would lead us to expect, all genetic variants known to yield gross mental deficiencies in the present range of human environments occur in quite small percentages in every ethnic group, local population, or “race.” No doubt there are undiscovered variants that produce smaller and subtler deficiencies in various environments. Such genetic variants will be less heavily selected against than the seriously deleterious variants that produce phenylketonuria or Tay-Sachs disease, and therefore may occur in higher frequencies; but they are equally unlikely to occur uniformly throughout any ethnic group. A possible exception may occur in cases where certain phenotypes are culturally interpreted as markers of ascribed membership in a stigmatized group. In cultural settings where (say) left-handed or dark-skinned or obese children are held to be congenitally stupid, we might expect such children to be differentially neglected, discriminated against, and taught to think poorly of themselves. In these environments, but not in others, genetic variants promoting right-handedness, light skin, or slenderness may turn out to be “genes for intelligence.” Again, it should be emphasized that there is no such thing as a “gene for intelligence” outside a particular environmental context, and that culture always affects the interaction between genes and environment in our species.

Summary and Conclusions

Almost every sort of human potential is limited by both environmental and genetic factors, but it makes no sense to ask whether a particular capacity is limited chiefly by heredity or by environment. The environment (including culture) determines the contribution of genetic factors to phenotypic variation. Genetic variants that affect a phenotypic trait in one setting may have no effect on it in other environments. Superior or fitter genetic variants are superior only in a specific environmental context. There is no such thing as "heritability," "fitness," or "biological superiority" in the abstract.

Hereditary differences between human individuals are real and important, and there are significant average differences in various respects between some regional populations. Correlations between genetics and geography are a legitimate subject for scientific investigation. However, these facts do not oblige us to think of human variation in racial terms. Regional populations that differ significantly in one respect usually resemble each other, and contrast with some third population, in certain other respects. Many regional populations today (e.g., those of North America) have been largely formed by centuries of massive immigration from widely separate parts of the world. The sympatric "racial" groups conventionally recognized within such populations are neither geographically, phenotypically, nor genetically discrete. The aggregate variation within such populations encompasses the entire range of variation in all the immigrant groups combined, and any typological "racial" groups that we attempt to distinguish in the population will contain large numbers of individuals descended from members of the other groups.

If human races are geographically delimited populations characterized by regionally distinctive phenotypes that do not occur elsewhere in significant numbers, then races no longer exist and have probably not existed for centuries, if ever. And if races are not geographically delimited, then racial classificatory categories are merely labels for polymorphisms that vary in frequency from one part of the world to another, like redheadedness or Type A blood. If "Negroid" and "Caucasoid" people occur on every continent, it makes no more sense to describe these groupings as geographical subspecies than it would to describe redheads or people with Type A blood as human subspecies. In particular, it makes no sense to try to study differences between races by subdividing a sample of North Americans. Yet a lot of the existing literature on supposed racial differences offers to do just that. Structuring our samples using these chimerical racial categories often obscures the nature and causes of past and present human variation.

Like other social constructs, races are real cultural entities. For many people, membership in a racial group constitutes an important part of their social identity and self-

image. But social facts are not necessarily part of the biological landscape. In multiethnic regional populations, races are merely ethnic groups linked to vague, inconsistent, and stereotypical ideal phenotypes. Growing awareness of the meaninglessness of racial taxonomy is currently leading increasing numbers of U.S. citizens to refuse to classify themselves racially, or to allow themselves to be so classified by others (Fish 1995). In the long run, we would probably be better off if we all followed their example.

Notes

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1. For a quick survey of the polar positions among physical anthropologists on the subject of race, see the recent issue of *Evolutionary Anthropology* in which two distinguished physical anthropologists were asked to provide separate reviews of the same four books dealing with issues of race and human genetic diversity (Armelagos 1995; Harpending 1995). Each reviewer praised the same books that the other condemned.

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