

rewarded in the United States, great controversy results when attempts to measure intelligence are applied not only to individuals but also to entire social groups, defined on the basis of gender, class, or "race." The former president of Harvard University was subjected to strong criticism when he acknowledged that fewer women than men become scientists and suggested, in the face of massive evidence to the contrary, that perhaps this meant that women simply had less "intrinsic aptitude" for science and engineering than men (http://www.harvard.edu/president/speeches/summers_2005/nber.php). Controversies have been as great or greater when ideas about intelligence have been linked to ideas about race. In the United States, for example, people tend to assign each other to "races" on the basis of phenotypic criteria like skin color. As we have seen, such "races" are then often regarded as different natural kinds, each sharing its own biological essence. From this assumption, it is a short step to conclude that differences between races must include differences in intelligence. Some scientists have devised IQ tests that they claim can measure intelligence, the results of such testing repeatedly showing that the average IQ score for African Americans is below that of European Americans, which is below that of Asian Americans.

Do IQ scores show that racial differences in intelligence are clear-cut and genetically determined? They do not. First, the idea that races are natural kinds assumes that racial boundaries are clear and that traits essential to racial identity (e.g., skin color) are discrete and non-overlapping. However, as we noted above, skin color is a continuously varying phenotypic trait, both among members of the so-called racial groups and the boundaries of those groups. Particular shades of skin color cannot be assigned exclusively to particular socially defined races, nor can they be used to infer any other so-called racial attribute, such as intelligence or athletic ability.

Second, it is far from clear that there is a single, accurately measurable substance called "intelligence" that some people have more of than others. Performing well on paper-and-pencil tests tells us nothing about problem-solving skills and creativity, which might equally deserve to be called "intelligence." Third, even if intelligence is such a measurable substance, we do not know that IQ tests actually measure it. People can score badly on an IQ test for many reasons that have nothing to do with intelligence: they may be hungry or ill or anxious, for example. When different social groups within a society consistently score differently as groups, however, we may suspect that the test itself is to blame. Arguing that IQ tests measure cultural knowledge, not intelligence, many critics contend that the vocabulary items used on most IQ tests reflect experiences typical of European American middle-class culture. People from different cultural backgrounds do poorly on the test

because their experiences have not provided them with the knowledge being tested.

Many studies have shown that how an individual will do on an IQ test is more accurately predicted by social class and educational background than by "race." When African Americans and European Americans are matched in terms of these factors, the differences in average IQ scores disappear (Molnar 1992). Similarly, African American children adopted by middle-class European American parents scored an average of twelve points higher on IQ tests than did African American children who remained in the lower-income communities from which the adoptees had come (Woodward 1992). Studies like these demonstrate repeatedly that IQ scores are not phenotypic traits uniquely determined by genes but that they are powerfully affected by a range of environmental factors over the course of the human life cycle. Or as Greg Downey and Daniel Lende put it, "humans' capacity for thought and meaning making emerges equally from social and individual sources, built of public symbol, evolutionary endowment, social scaffolding, and private neurological achievements" (2012, 23–24).

Phenotype, Environment, and Culture

In recent years, many evolutionary biologists and biological anthropologists have recognized that trying to attribute every phenotypic trait of an organism to adaptation is problematic. Sometimes an adaptive explanation seems transparently obvious, as with body shape in fish and whales or wing shape in bats and birds, which equips these animals for efficient movement through water and air. Other times, adaptive explanations are less obvious, or even contrived. As we saw in Chapter 2, the wings of contemporary insects are better understood as an exaptation, when appendages that evolved as an adaptation to one set of selective pressures began at some point to serve an entirely different function.

In other words, the trait an organism possesses today may not be the direct result of adaptation but, instead, may be the byproduct of some other feature that was being shaped by natural selection. It may also be the consequence of random effects. Jonathan Marks (1995) has observed, for example, that anthropologists have tried, without notable success, to offer adaptive explanations for the large, protruding brow ridges found in populations of human ancestors. He suggests that brow ridges might well have appeared "for no reason at all—simply as a passive consequence of growing a fairly large face attached to a skull of a small frontal region" (Marks 1995, 190).

We must also remember that phenotypes are shaped by environment as well as by genes. For example, some have argued that slow growth in height, weight, and body composition and delayed onset of adolescence among