

# A further discussion on human evolution

3 January 2012

*Reader Bryan D. sent in the following observation on the article “New research may show that Neanderthals did not go extinct”:*

It is also necessary to note that the shift between cultural and biological evolution, when mankind began to adapt not necessarily at the whims of time and chance, was when humans first began using tools. The creation of fire and the wheel, as well as cave drawings, are most likely not an absolute boundary between when biological and cultural evolution dominated human society, but it is a clear indicator that cultural evolution was becoming and would eventually become the dominant drive in human development. Or perhaps such considerations mark the boundary between species? Maybe the difference between H. neanderthal and H. sapiens is cultural, not biological, evolution.

I would also add, as a direct response to those who would take this research in a racist direction, that even if these results are born out from further research, it does not mean that there is somehow a “subspecies” of humanity. These people may have certain physical traits of neanderthals, such as the different facial structure, but they still have the same capacity for advanced conscious thought that all other humans do. Accusing those with a different bone structure of being “less-than-human” is akin to declaring the same about humans with a different skin tone.

*Philip Guelpa responds:*

I would like to amplify on your second point. As I indicated in the article, the admixture of genetic material from Neanderthals and Denisovans into the modern human gene pool was likely a beneficial development. Among other things, it may have enhanced the ability of the hybrid individuals to withstand cold and to resist diseases indigenous to the areas into which they were immigrating. This illustrates a fundamental difference between fascist and other racist ideologies on the one hand and modern

evolutionary theory on the other.

In contrast to racists who tout the importance of “racial purity” and the superiority of one race over others (n.b. the concept of “race” itself is a biologically meaningless construct), genetic diversity is *key* to a species’ survival. Species are not entities unto themselves. Rather, they are in constant, dynamic, dialectical balance with their environment. A species’ genetic pool, on the one hand, and its environment, on the other, are the thesis and antithesis which create the continuously changing unity of the species from generation to generation.

Since the environment of any given species, which includes both the physical world and other species, is constantly changing in ways that a species cannot “predict,” the availability of a range of genetic variation within the species’ gene pool increases the likelihood that the genetic “raw material” will exist on which the species may draw in order to develop an effective adaptive response (i.e., to evolve). Low genetic diversity increases the likelihood of the alternative, namely extinction.

A clear example of the importance of genetic diversity comes from a study of moths during the industrial revolution in England. Certain birds prey on particular kinds of moths. In the pre-industrial environment these moths evolved a relatively light coloration in order to blend in with the predominant coloration of the bark on trees on which they often rested. This made the light-colored moths less visible to the birds and, therefore, promoted their survival. Dark-colored variants existed, but tended to be selected against (i.e., eaten), so their numbers remained low. As smoke pollution from industry increased, soot tended to deposit on tree trunks, making them appear darker. Consequently, the light-colored moths became more visible and the dark-colored ones less so. As a result, there was a shift in the relative proportions of the two colored variants. In other words the moths adapted to

the changing environment – they evolved. If the genetic material for dark coloration had not existed, the moths would have suffered higher rates of predation and perhaps have gone extinct.

The dangers of low genetic diversity are also illustrated by the Irish potato famine. Potatoes were domesticated in pre-Columbian times by the inhabitants of South America. Many different varieties of potatoes were developed, each adapted to a particular microclimate. In this way, people could grow a variety of potatoes, thus maximizing the probability that even if there were climatic variations or diseases that adversely affected some varieties, others would likely survive and provide the margin to sustain people's diets. By contrast, when the potato was brought to Ireland, one variety was planted overwhelmingly. Therefore, when a disease affected that particular variety, production collapsed with devastating consequences to the Irish population.

The same principles apply to human beings. While modern humans' principal mode of adaptation is cultural, biological adaptation still plays a role, in the response to disease for example. Modern medicine is a very recent development and is available to only a limited degree to much of the world's population. Though this is a situation that can and must be remedied, the existence of genetic diversity among humans provides another line of defense.

The importance of genetic diversity is relevant not only for populations, but for individuals as well. We all carry a "genetic load," certain genes which under given circumstances may have a negative effect. Luckily, organisms carry two copies of genes in their compliment of DNA, one from each parent, which may be different. Often, the "positive" form partly or completely masks the effects of the "negative" form. This allows individuals who carry one copy of the negative variant to survive, so that this latter form continues to exist at a low frequency in the gene pool. As indicated above, sometimes genetic variants which are detrimental in one environment may be beneficial in another. Thus, this reserve of potentially useful genes is maintained for possible use if circumstances change.

Genetic diversity in individuals may also result in what is known as "hybrid vigor." This is the observation that often times individuals whose parents were genetically relatively dissimilar have greater

"fitness" (i.e., greater survival and greater reproductive success) than those produced by genetically more similar parents. This is the opposite of the often negative effects of what is popularly referred to as "inbreeding." Individuals with dissimilar parents are less likely to inherit a double dose of negative genes.

The bottom line is that genetic diversity is of great positive value for species survival. At the same time, modern medicine and technology have the potential to ameliorate the negative effects of genetic diseases. Such diseases have nothing to do with racist concepts of genetic purity or inferiority, which have no foundation in science and no place in political dialogue.

All currently living humans belong to the same species. Genetic diversity exists, which is highly beneficial. Nevertheless, all humans, excluding those who have specific genetic defects, have the capacity for fully abstract, symbolic thought, which is a fundamental characteristic of *Homo sapiens*. It is the negative effects of class society, not genetics, which prevent people from reaching their full potential.



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