Qeios

Peer Review

Review of: "Misestimation of Expected Genetic Differences: A Statistical Note on Some Recent Papers"

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I agree that “medium to large [genetic] differences between human ancestry groups can arise without pronounced natural selection.” I would also add “so what?”

Genetic drift is a random walk by alleles of little or no adaptive value. If enough time passes, it can certainly cause substantial genetic changes to a population, but not useful changes in anatomy, physiology, or behavior.

We see this if we compare chimpanzees with humans. Even if we exclude bonobos and consider only chimpanzees from equatorial Africa, the latter are as genetically differentiated as the entire human species (Gonder et al., 2011). Yet, without genomic data, an experienced primatologist cannot tell them apart. This should be no surprise. Yes, chimpanzees have differentiated into different populations over a longer time scale than we have, but those populations have adapted to similar environments. They have differentiated primarily through genetic drift. Conversely, humans have adapted to a much wider range of environments over a shorter time scale, and they have differentiated primarily through natural selection.

We can make similar comparisons within the human species. The ancestors of Sub-Saharan Africans and those of Papuan New Guineans separated from each other probably 50 to 60 thousand years ago. Yet they still look similar, certainly more so than Europeans and East Asians—whose ancestors parted company much more recently.

In sum, significant evolutionary change is not just a function of time. It’s also a function of adaptation to different environments. Such adaptation is typically rapid and confined to short intervals of time, such as when a population buds off and enters a new territory. In contrast, genetic drift is typically slow and spread over a long span of time.

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You might ask: “But what if a random mutation proves to be adaptive? Isn’t that a case of genetic drift causing a useful change?” No, it’s a classic case of evolution by natural selection. You might counter: “OK, but what if genetic drift causes a useful change even though natural selection isn’t pushing for that change?” In that case, the change cannot be useful—*by definition*.

Let’s suppose that genetic drift causes the mean IQ to increase in a population. Natural selection would then step in to return the mean IQ to its previous level. This is “stabilizing selection,” and it’s the most common evolutionary state. Remember, there are reasons why the mean IQ has increased in our species only at certain times and in certain places. In some situations, high intelligence isn’t worth the bother; it’s better to hardwire the appropriate behavioral response instead of having to learn it (typically, the hard way). Finally, keep in mind the high metabolic cost of mental processing. An increase in mean IQ isn’t cost-free.

There’s not much room for debate here because the definitions do not permit debate. Genetic drift cannot be driven by differences in adaptive value. If it were, it would not be genetic drift. It would be natural selection.

Population differences in cognitive ability

I agree that significant differences in mean IQ exist between human populations, but these differences have arisen through natural selection, and not through genetic drift. Cognitive ability is a trait with a high metabolic cost and, potentially, high adaptive value. Such traits are unaffected by genetic drift because natural selection would quickly intervene to restore the equilibrium of selection.

I certainly disagree with Kevin Lala and Marcus Feldman when they state that "recent human evolution has been dominated by drift rather than selection." This question was addressed by John Hawks in his study of genomic change in our species; specifically, how fast new SNPs have appeared. There were two main findings:

- Changes to the human genome accelerated more than a hundredfold when hunting and gathering gave way to farming and other cultural changes (sedentary living, growth of towns and cities, rise of social complexity, etc.).
- The faster pace of genetic evolution lasted well into the time of recorded history, peaking at 8,000 years ago in Africa and 5,250 years ago in Europe.

Genetic evolution began to accelerate at a time when humans had already spread from the equator to the Arctic. The impetus for acceleration came from people adapting not so much to new natural

environments as to an ever-wider range of cultural environments. They were no longer adapting solely to new places. They were adapting to new ways of life.

This is not genetic drift. This is a classic case of evolution by natural selection.

Hawks' study was published in the same journal that published Lala and Feldman's paper. Why does his study go unmentioned in their paper? If one wants to argue for a certain point of view, it isn't enough to cite those people who support it. One must also cite those who do not ... and then show how they are wrong.

This "oversight" is especially incredible given that Hawks' study has been foundational for research on recent human evolution, particularly gene-culture coevolution. It's like criticizing Keynesian theory without mentioning John Maynard Keynes.

References

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Declarations

Potential competing interests: No potential competing interests to declare.