Creating A Genetically Compassionate World

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Abstract

The theory of evolution proposes that environmental factors influence the genetic makeup of species over time. Given the unprecedented control that *Homo sapiens* (humans) have on their environment, the question becomes whether evolutionary forces are still affecting humanity, gradually changing the genetic makeup of our species. This article focuses on behavior, which requires determining whether behavior is, to some extent, genetic. The question thus is: do parents transmit behavioral traits to their children? Behavioral scientists have thrived to answer this question, and there is some evidence to support genetic determinants of individual behavior. Based on this premise, the study examines the consequences of a conceptual isolated society that rewards ruthless behavior affecting the genetic evolution of its population.

The modern theory of evolution was formulated by Charles Darwin in his book "On the Origin of Species", first published in 1859 (Than, 2021). Darwin describes how organisms evolved over several generations through the inheritance of physical and behavioral traits. According to Darwin's theory, individuals must acquire traits that help them adapt and survive in their environment. This enables them to breed a generation with characteristics that are more adaptive to a given environment.

Natural selection thus plays a prominent role: only the most adapted survive. Natural selection can result in subtle changes in the average characteristics of a species, or in extreme cases, in speciation, which is the emergence of a new and distinct species from an existing one. Natural selection is one of the processes that drives evolution and contributes to our understanding of the diversity of life on the planet (Saber, 2019). Natural selection has shaped modern *Homo sapiens* (humans). Humans have evolved to adapt to the different environments that they inhabited. Traits that promoted survival were passed down through generations. Given the unprecedented control that humans have over their environments, are humans still evolving today?

Introduction

Corruption is contagious, a virus that infects most members of a nation or community. Individuals who initiate illegal acts, especially those in positions of power or influence, establish a pattern of behavior that is soon emulated by the rest of the society. This illicit behavior is rooted in ruthlessness, the belief that personal gain can be acquired at the expense of the rest of the members of society who, consequently, would suffer, and the sense of community, of sacrifice for the good of everyone, would fade. Once corruption permeates a society, even the nicest and most altruistic of people may engage in such behavior, perhaps because they lose

hope or faith in the community, or maybe because this becomes the only means of survival, of acquiring the basic needs for living. Most people in Lebanon are aware of these realities; but is there a deeper danger to humanity?

Evolutionary Principles

Evolution, the process of natural selection, is based on four principles: variation, selection, inheritance, and time:

Variation is present in all species, including humans. Even members of one family have different shapes, heights, and eye colors, to name a few characteristics. Most of these characteristics are determined by an interplay between genetic (inherited) and environmental factors, with the relative contribution of each depending on the characteristic. For example, the height of any individual depends on the genes inherited from the parents (genetic) and the amount of food that was available to support the growth of the individual (environment).

Due to this inherent variation, environmental factors will determine which individuals are most adapted, and hence more likely to thrive and have children: selection. Several people have told the authors that mosquitoes are getting harder to catch in households. We would propose that the "slower" mosquitoes in the population have already been caught and killed by people, leaving a population of "smarter" mosquitoes to breed and have children. On a more serious note, this selection is one of the cornerstones for the appearance of bacteria that are resistant to many antibiotics (Rai & Black, 1999)

If a characteristic has a genetic component, even partially, and is thus inherited, then the selection process would change the average genetic makeup of the population in successive generations: inheritance and time (Bateson, 2021; Drayer, 2017). The more "genetic" a characteristic, the less time it would take for environmental factors to affect the average genetic makeup of a population or species. These evolutionary forces have acted to shape the species we see today. However, once humans appeared and began to exert control over their environments, to what extent were these forces swaying?

A Brief History of the Origins of *Homo sapiens*

All modern humans are members of the *Homo sapiens* species. The genus *Homo* evolved from the genus *Australopithecus* and consisted of multiple species. *Homo habilis* and *Homo rudolfensis* are the earliest named species having emerged 2.3 million years ago. *Homo erectus* was the first archaic human species to leave Africa and spread over Eurasia 2 million years ago and was considered the first to acquire a human-like body design (Dunsworth, 2010). Thus, several human-like species coexisted, evolved, occasionally interbred, and became extinct; indeed, DNA evidence reveals that the Neanderthals, an extinct species of the archaic human, may have donated up to 6% of their genome to modern humans (Noonan, 2010).

Homo sapiens, or modern-day humans, is the remaining species. It is believed that *Homo sapiens* originated in Africa before spreading to other continents. At least two waves of

migration occurred, the first about 130,000 years ago and the second approximately 70,000 years ago (Karmin et al., 2015). This eventually resulted in the distinct genetic makeup of modern humans displacing archaic groups (Stringer, 2003).

Humans evolved based on the evolutionary forces that worked on all other species. Yet, once humans began to "control" their environment, was there any evidence that such evolutionary forces remained at play?

Homo sapiens' Current Evolution

There are many studies that suggest that modern-day humans are still evolving, not yet in the appearance of a new species, but certainly in the acquisition of new characteristics. For example, the ability to handle the sugar lactose in milk is one of the most recent natural selections in humans. Adults in most parts of the world are unable to consume milk because their bodies stop producing lactase, an enzyme that is genetically encoded and digests the sugar in milk, once they have been weaned. Despite this, more than 70% of European adults enjoy drinking milk without the gastro-intestinal problems that many of us experience. This is because a genetic change that allows the continued production of lactase in adults is more prevalent in Europeans than in other regions. This genetic shift appears to have occurred between 5,000 and 10,000 years ago, about the period when Europe began to domesticate milk-producing farm animals, such as cows (Leonardi et al., 2012).

Another example is hemoglobin levels of populations living at high altitudes. The environment at high-altitude areas is different from that at areas found at sea levels. The air in high-altitude areas is thinner, meaning that there is a lower oxygen concentration which causes an insufficient amount of oxygen to reach the body tissues. However, approximately 1.1% of the world's population lives 2,500 meters above sea level. It would be challenging for people living at sea level to survive such conditions, so how have populations living at high altitudes survived? Studies on Tibetans living at an altitude of approximately 4,500 meters above sea level discovered the presence of a different version of a gene called *EPAS1*, known as the altitude gene, in their genomes (Gibbons, 2014). This different version of *EPAS1* allows Tibetans to produce more hemoglobin and survive low-oxygen environments (Peng et al., 2011). Indeed, the Tibetan *EPAS1* variant seemed to have been acquired through interbreeding between modern and archaic humans (Jeong et al., 2014).

Physical characteristics are still subject to evolutionary forces in modern-day humans. Is this also true of behavioral characteristics? In other words, are some human behaviors, at least to some extent, genetically encoded?

Genetics of Human Behavior

It is thought that differences between an individual's mental health, personality, and intellectual ability are linked to some genetic predispositions. For example, children who inherit a deleterious gene that leads to a genetic deficiency in the enzyme monoamine oxidase appear more vulnerable to physical abuse compared to children carrying normal monoamine oxidase-A.

Monoamine oxidase-A deficiency is characterized by behavioral problems and mild intellectual challenges (Buades-Rotger & Gallardo-Pujol, 2014).

Behaviors that may impact cooperativity between humans may also have genetic components. One study found a link between a gene called *AVPR1a* and ruthless behavior. In this study, 200 students were classified into two groups: dictators and receivers. The dictators were given a certain amount of money, and they were told to share as much of this money with the receivers as they wanted: about 18% of all dictators kept all the money. This "ruthless" behavior was correlated with the length of *AVPR1a*.; people with short *AVPR1a* may feel less rewarded by the act of giving and thus more likely to act ruthlessly (Hopkin, 2008). In addition, researchers at the Autism Research Centre discovered links between the gene *LRRN1* and empathy, especially in women (Chakrabarti & Baron-Cohen, 2011).

Conceptual Scenario of an Isolated Population

Emerging studies indicate that human behavior, including those associated with cooperative behavior, may be genetically determined to some extent. If we accept this premise, what are its implications towards the behavior of our species, even its survival?

Let us imagine an isolated community whose members exhibit varying levels of empathy and/or ruthlessness; some individuals may be completely empathetic, ruthless (socio-pathic), or something in between, depending on the situation. In that sense, the average behavior of that population would fall somewhere between ruthlessness and empathy. Let us also assume that the socio-political system privileges the most ruthless who gain the most wealth and power. Wealth, in this case, allows for more food, water, and other necessities for survival. As a result, the number of ruthless children increases; more ruthless, meaning less empathetic people, have more children. This is because only the ruthless is being given the necessary tools of survival. If we accept that ruthlessness/empathy has a genetic component, how would the average ruthless/empathy behavior of the population change over time?

According to the four principles of evolution, ruthless people are most adapted to their environment (socio-political system) and will have more children; these children will inherit the "ruthless" genetics. In contrast, empathetic people will have fewer children. Indeed, over time, the average behavior of the population would gradually genetically shift towards ruthlessness, meaning, in this isolated community, the genetics of the population would have changed in a way that more individuals would be predisposed towards ruthless behavior. The result, over geological time, may be the appearance of a new species or extinction by having enough ruthless people who would eventually destroy their habitat.

Implications and Hope

If one accepts all this data and the proposed premises, one feels compelled to examine today's *Homo sapiens*. We live in a world that privileges power over

compassion, competition over collaboration (even in schools). Are our current socio-economic and political systems evolving humans towards a more ruthless version of *Homo sapiens*? How will the environment, the world, cope with such a version of humanity? Perhaps it is through climate change, wars, pandemics, we are reminded that by attempting to exert absolute control over each other and our environments, we are only driving our species away from the values that ensured our survival when we first emerged.

This evolutionary drive is not irreversible. We can adopt systems that honor and reward these values: cooperation, empathy, and sacrifice. We can remember that through rewarding empathy and cooperation, we can all work together to thrive, grow, and ensure that this world remains a haven for humanity.

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