Does evolution explain human nature?

Geoffrey Miller

More fully by the day.

In the last two decades, evolutionary psychology has cast new light on ever more facets of human nature. And contrary to popular critiques of the field, it has done so in ways that are ever more intellectually thrilling, morally enlightening, spiritually satisfying, and socially progressive. What we mean by "evolution" and "human nature" continues to develop through mutual interaction, like the passions of a whispering couple in a close-embrace tango.

During the 1990s, biologists developed a whole new toolbox of ideas about the nature of evolution, including theories based on life history, multi-level selection, strong reciprocity, good-genes sexual selection, and costly signalling. These terms may be unfamiliar to non-specialists, but they represent a revolution in Darwinian theory and have proven their value again and again in understanding aspects of human nature that defy simplistic "survival of the fittest" reasoning.

Likewise, our understanding of human nature has been growing exponentially through work in evolutionary psychology, evolutionary anthropology, human evolutionary genetics, and primate behavior. Our model is no longer a tattered old treasure map of a few basic instincts (hunger, fear, lust) but a topographically detailed Google Earth panorama across a whole continent of familiar capacities (romantic love, moral commitment, self-deprecating humor, conspicuous charity, and many more). New theories have led researchers to acknowledge new aspects of human nature, and recognizing previously overlooked aspects of human nature has promoted new progress in evolutionary theory.

My own research has been inspired mostly by good-genes sexual selection theory (the idea that animals choose their partners based on cues about genetic quality) and costly-signalling theory (the idea that only animals in good condition can afford seemingly pointless displays like extravagant plumage). These theories have proved enormously useful in understanding a range of human behaviors that have seemed to have no clear survival payoffs, like music, dance, art, humor, verbal creativity, conspicuous consumption, and altruism.

Consider a few examples of new empirical discoveries from research I have done with various collaborators:

* Gil Greengross and I showed that women are more attracted to men who use self-deprecating rather than other-deprecating humor during courtship (but only if the men are fairly high in social status). This is consistent with the costly-signalling idea that self-mockery is a virtue that only the successful can afford.
* Martie Haselton and I showed that women at peak fertility, just before ovulation, show a stronger preference for creativity as opposed to wealth in potential mates. This supports the idea that creativity is an indicator of "good genes" rather than of potential as a "good provider."
* Vladas Griskevicius, several colleagues, and I showed that if men are put in a romantic mood rather than a neutral mood, they are more likely to spend money on conspicuous luxuries, whereas women spend more time on conspicuous charity, such that each sex is signalling a trait (social status or kindness) that is relatively more desired by the other sex.

Each new finding like this illustrates how new evolutionary theories can lead to discoveries that were never predicted by the standard "blank slate" view of human behavior.

Still, evolutionary psychologists must guard against complacency. We should not imagine that we have discovered every important facet of human nature, or that evolutionary theory as it

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exists circa 2009 has told us everything we need to know about the selection pressures that have shaped human nature.

Consider just one new development in biology: the whole new world of RNA, which may help explain the unique behavioral flexibility of the human brain. The "central dogma" of genetics since the 1950s was that DNA is transcribed into RNA, which is translated into proteins, which generate all the adaptive complexity of organic life. Thus, only the DNA sequences that code for proteins are important, and only evolutionary changes in protein-coding DNA are worth analyzing. When journalists report that humans have "only" some 25,000 genes—just a few more than the 20,000 of the *C. elegans* worm—they are referring to these protein-coding genes.

This "central dogma" has guided the Human Genome Project, the HapMap project, and even the genome-wide association studies that dominate the human genetics journals these days. But the idea has been decisively overturned in the last decade by new discoveries about the diversity of RNA that is transcribed from DNA but that is not, in turn, translated into proteins. Most of this "non-coding" RNA seems to constitute a genomic regulatory system of vast complexity—a system that determines the expression of different protein-coding genes in different cell types, tissues, and organs at different times during development and in response to different environmental changes. The human genome has a vastly more complex RNA system than *C. elegans*.

The molecular biologist John Mattick and others have argued that the evolution of this RNA system was crucial for three great innovations in life on earth: the emergence of the eukaryotic cell, the Cambrian explosion of multi-cellular life, and the complexity of the human brain. In this view, humans differ from other great apes not so much at the level of protein evolution but at the level of the RNA regulatory system that orchestrates the spatio-temporal patterning of gene expression and protein function. The inherited DNA that is translated into this RNA regulatory system does not just determine "innate instincts" or "hard-wired" behaviors; it also orchestrates dynamic changes in brain function and behavior under different circumstances.

Indeed, it seems likely that RNA is crucial in all sorts of behavioral flexibility that humans have, from feeling different moods (elation, love, depression, ambition) to laying down new memories, to super-charging our creativity, humor, and altruism when we are courting a new mate. All of this may be mediated by complex changes in gene expression throughout the brain, over time scales ranging from hours to decades. We are realizing that our genes do not just determine the blueprint for an infant's brain; they are working actively throughout our lives, governed by this vast RNA regulatory system, giving us degrees of behavioral creativity and flexibility that it will take us decades to understand.

In short, evolution explains human nature very well indeed, but we are far from finished in the grand project of naturalizing human consciousness.

Geoffrey Miller is an evolutionary psychologist at the University of New Mexico. He is the author of The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature *and* Spent: Sex, Evolution, and Consumer Behavior.