The Human Instinct

What’s in it for me? A whistle-stop tour of human evolution.

For tens of thousands of years, we humans lived by stories that made sense of our place in the universe and how we came to be. Amongst all creatures – the stories said – we were special. Then, about 150 years ago, Charles Darwin dealt those stories a serious blow. He advanced an idea, called natural selection, which said that variations in organisms that aid in survival tend to flourish. All living organisms – humans included – had evolved over time. This was a simple, yet world-shaking idea. For those who deny it, and for many of those who accept it, the theory of evolution would seem to imply that those old stories had it dead wrong. If we evolved like any other organism, then our lives have no special meaning or purpose. When we pretend otherwise, we’re fooling ourselves. We’re no more significant, free, or unique than a slug or a potato. Fortunately, as we’ll learn in these blinks, evolution doesn’t actually require this dire interpretation of humanity and the meaning of life. We are unique animals in the epic tale of creation. And we have evolution to thank for it. In these blinks, you’ll learn

why we’re not at the pinnacle of evolution, but we’re nonetheless unique among Earth’s organisms; why deferring to evolution as an explanation for everything leads to some bad ideas; and how evolution gave us the capacities of free will, consciousness, and reason.

Natural selection explains a lot, but not all, of our evolution.

Charles Darwin gets top billing as the founding father of the theory of evolution by natural selection, but another British naturalist, Alfred Russel Wallace, actually beat him to it. Wallace and Darwin were colleagues, penpals, and a source of support to one another. In fact, a letter from Wallace prompted Darwin to publish his groundbreaking work, On the Origin of Species in 1859. But, as time passed, Wallace began to have doubts. The theory wasn’t enough. How could it be, he wondered, that a mind adapted for mere survival could paint a portrait, construct a cathedral, or compose a symphony? How could such a mind uncover the scientific truths of the universe? The answer may lie in a truth that both Darwin and Wallace understood: not all evolution is directly attributable to natural selection. In other words, evolution leaves room for accidental and fortuitous outcomes. The strange abilities of the human brain may result from one such happy accident. About three million years ago the human brain began to grow, and within what amounts to a geological instant, it tripled in size. We’re still exploring why this happened, but we know this much: our new, big brains not only helped us walk, talk, forage, and hunt, they also gave us abilities that had no immediate bearing on survival. That’s the “accidental and fortuitous” part. For example, our big brains made it possible for us to contemplate ourselves, the earth, and the stars. They made it possible to find answers by creating myths, religion, art, literature, math, and science. They made it possible for us to understand evolution itself. In 1979, the evolutionary biologists Steven Jay Gould and Richard Lewontin coined a term for the happy accidents of evolution: spandrels. They borrowed the term from architecture, and it describes the triangular forms that allow an arch to support a dome in, for example, a cathedral. In

their essay “The Spandrels of San Marco” Gould and Lewontin use the architectural features as a metaphor for the occasionally beautiful and often powerful byproducts of evolution. As we move through the next few blinks, keep spandrels in the back of your mind. We’ll learn more about how spandrels of the brain made us what we are. But first, we have to come to terms with some of the potentially dispiriting implications of our natural origins.

Learning that we’re mere products of evolution may be dispiriting, but we can’t ignore the evidence.

So, we’ve established that we’re part of evolution, just like any other organism. For many, this truth hurts. It’s a demotion from the ordained place we held in our myths. Back in Darwin’s days, and for a good while after that, those who opposed evolution didn’t have to dig very deep to find evidence that seemed to contradict the new theory. The fossil record connecting us to ancient apes was riddled with gaps and misinterpretations. Naturalists sought the “missing link,” a species to serve as a halfway mark between us and our ape ancestors, but they hadn’t had much luck. The so-called “Java Man,” uncovered in the forests of Indonesia, was little more than a piece of skull. “Piltdown Man” from the dirt of southern England turned out to be a hoax. All in all, humanity’s evolutionary fossil record wasn’t much to go on. Things have definitely changed since then. The fossil record now includes thousands of skull pieces that show a steady lineage of humans going back over seven million years. Our analysis has radically improved, as well. We can input the contours of these skulls into computer models and show precisely how the face shapes, jawlines, and brain sizes of ancient humans evolved to the modern form. Study of the human genome has uncovered its own fossil record. Scientists have discovered that we carry a gene meant to aid in laying eggs with a protein-rich yolk. This gene is an inheritance from our reptilian ancestors. This is just one little example of the overwhelming scientific support behind the theory of evolution. There’s simply no substantive debate on the science. Real objections come from our unease, our sense that we’ve lost the holy significance we were so sure we possessed. We can’t recover that confidence by denying evolution. And as we’ll see in the next blink, we also can’t recover it by construing evolution as a vanity project.

We’re not the pinnacle of evolution.

In the early 1700s, a Swedish man called Carolus Linnaeus gave himself a big job. He set about drafting the first thoroughly systematic classification of every organism on Earth. In 1735, he brought forth his work as a book titled Systema Naturae. Linnaeus’s work had a huge impact on zoology, and it influenced the taxonomy of animals for centuries. For example, it was Linnaeus who introduced the binomial classification system which uses two names for every organism, one for the genus, and one for the species. It’s thanks to him that we’re known as Homo sapiens, which, by the way, means “the thinking human.” Like any other author, Linnaeus had his critics. He’d included Homo sapiens in Systema Naturae, which implied, for some, a flattening of the hierarchy between man and nature. Worse, Linnaeus grouped humans with monkeys, apes, and sloths, an association that did not please the theologians. In later editions, Linnaeus added religious poetry to the frontispiece and gave the name primas, or

primates, to the human and ape group. The name was meant to indicate that its members were animals of the highest rank. But, standing by his convictions as a natural historian, Linnaeus refused to put Homo sapiens in a category of its own. We belong with the apes, he said. The tension at once to recognize our connection to animals and to maintain our status above them hasn't disappeared. Perhaps the clearest depiction of these conflicting desires appeared in 1965, two centuries on from Linnaeus. In that year, Time Life published a natural history book that featured a brilliant, five-page fold-out illustration. The illustration showed a parade of humanoids, spanning 25 million years from left to right, from protoapes to Neanderthals to modern humans, all male, each one more upright than the last, striding forward. The illustration, which was called March of Progress, or The Road to Homo Sapiens, has since become the single most influential image in popular conception of human evolution. Do a Google image search for "human evolution," and the March of Progress, or a parody of it, will certainly show up in the top results. But evolution has no grand hierarchy. There's no ladder, pyramid, or tree. No prize for best creature. There's only each species's struggle with changing circumstance. Each one has a niche and its means of securing it. Each one is the survivor of extinct predecessors. In this way every species is unique. So, in what ways are we unique? For one, we happen to be the sole species capable of discovering the natural process that created us. We'll offer a more thorough explanation later in these blinks, but before we do, we have to examine another mistaken tendency in the way we interpret evolution.

Looking to evolution as an explanation for everything can lead to some very bad ideas.

In February 1978, the biologist E. O. Wilson stepped up to the podium at the annual meeting of the Association for the Advancement of Science. Wilson had a new field of inquiry to propose: Sociobiology. Wilson had risen to prominence by brilliantly decoding societies of fire ants. Sociobiology, Wilson hoped, would apply a similar analysis to all of Earth's creatures: from microorganisms to prairie dogs and, most importantly, human beings. The new science aimed to reveal the biological roots of all forms of human organization. The idea was controversial, to say the least. Two of Wilson's fellow biologists at Harvard University, Stephen Jay Gould and Richard Lewontin, told the New York Times that sociobiology would justify the prejudices and inequalities of our society in the way the Nazis had justified the Holocaust with eugenics. Perhaps then, it's no surprise that when Wilson took the podium, an anti-racist protestor burst forth and doused him with a pitcher of ice water. Sociobiology never took hold, but in a way, Wilson has been vindicated. Many of sociobiology's aims were taken up in a new field that emerged a decade later: Evolutionary Psychology. Like sociobiology, evolutionary psychology proposes to make sense of all behavior in biological terms. According to the young discipline, anything human can only be truly understood in the light of evolution. The field has made progress in suggesting biological roots for family bonding and for our fears of snakes, spiders, strangers, and heights. But, science's ability to demonstrably track behavior to specific genes is modest. Essentially, we can do it with fruit flies . . . in a lab. Still, evolutionary psychologists have published a whole bunch of papers with ambitious claims, such as purporting to have identified the biological factors of why women supposedly love to shop, why certain paintings attract viewers, and, more seriously, why rape persists in contemporary society. These papers make for

great clickbait, but they seldom come with genetic evidence and rarely withstand scrutiny or cross-cultural comparisons. The extremes of the field make even more far-reaching claims. They argue that human behavior is nothing but predetermined, physical reactions to stimuli, and that, consequently, independence of thought and a sense of individuality are false. All morals and values are screens for survival instincts. But it's unfair to lay this dire vision solely at the feet of evolutionary psychologists. Darwin, himself, wondered whether our evolved nature meant that our minds were fundamentally untrustworthy. Fortunately, as we'll see in our final blinks, evolution does not require such a grim view.

The human brain, for all its flaws and exceptional power, is a product of evolution.

Before moving on, let's review a bit of what we've covered so far. First, humans are a part of – not apart from – evolution. No other origin story has empirical evidence that can hold a candle to the explanatory power of evolution through natural selection. But this truth came with a cost. We've lost the confidence once given by our creation myths. To compensate, we may be tempted to rearrange evolution to put ourselves at the top, but the science doesn't allow it. On the other hand, looking to evolution to explain everything about humanity has its own pitfalls. It's worth pausing further and noting that we, imperfect as we are, figured all of this out. We're the creatures of evolution who discovered evolution, or as astronomer Carl Sagan once said, we are a part of the "Cosmos grown to know itself." What's more, we're here, right now, reasoning through the implications of the discovery of our own origin. This level of cognition is without peer among any animal. We're truly exceptional organisms, and we have evolution to thank for it. But how did it happen? Why would a process attuned to the rigors of survival produce minds that can, for example, handle differential calculus? What evolutionary purpose, as Alfred Russel Wallace wondered, is served by composing a symphony? Well, do you remember that geological flash millions of years ago in which our brains tripled in size? Becoming smarter helped us survive, and as our raw intelligence increased, so did our capacity for speech, cooperation, and abstract thought. At some point, the largeness of our brains allowed neurons to link in new patterns, specifically in the regions associated with memory retrieval, judgment, and self-awareness. The neurons in these areas became "free" in a way they couldn't within a smaller, more rigid brain. They uncoupled from the needs of survival and became, to use a term we learned earlier, spandrels. Just as architectural spandrels become features of beauty apart from their structural importance, the evolution of our minds went beyond survival to give us our unparalleled linguistic ability, exceptional imagination, and powers of reason. None of this is to say that the brain is without flaws. Our brains are prone to cognitive error, swayed by simple drugs, and easily duped by illusions. Yet we're the ones investigating these weaknesses. We're the cognitive scientists mapping the biases, the chemists altering perception, and the illusionists performing the trick. What other animal can claim such powers?

Evolution doesn't explain away the individual experience of life.

Consciousness. It's a problem. When, for example, does it begin? When does a bit of information, say a mosquito in your periphery, go from your subliminal awareness to your conscious awareness? What threshold must the stuff of the world cross to make it into your consciousness, that full sensory movie you experience as life? French neuroscientist Stanislas Dehaene has attempted to crack this problem by flashing numbers at volunteers in brain imaging machines. He observed that an image held for 50 milliseconds goes from a blip in the visual cortex into a tumult of electricity throughout the brain, indicating that at that instant, the image has become conscious experience. Dehaene's milliseconds wouldn't satisfy the celebrated American philosopher Thomas Nagel. For Nagel, consciousness is so essentially subjective that science will never crack the true nature of it. Physics, he famously asserted, can tell us nothing of what it feels like to be a bat. For Nagel and other philosophers, this gap in the scientific account of how the stuff of the world becomes consciousness is a fatal flaw in the evolutionary conception of nature. A neuroscientist like Dehaene could, if they chose to, take up Nagel's challenge. Dehaene could recreate experiences similar to being a bat and track the brain's processing millisecond by millisecond. But the problem isn't the science. Just as creationist deniers of evolution don't really have a problem with the fossil record, Nagel doesn't really have a problem with evolutionary neuroscience. The problem is the implied devaluing of consciousness. But the theory of evolution doesn't make this implication. It doesn't devalue individual experience and doesn't explain away Nagel's gap between matter and mind. Consider this. Atoms aren't alive, but when they interact within a cell, life occurs. No cell has consciousness, but when 70 trillion cells interact as a human being, consciousness occurs. Just as 12 tones can form a symphony, and 26 letters can form Shakespeare's great works, in evolution, the complex arises from the simple. True, certain camps of ardent neo-Darwinists do argue that consciousness and free will are illusions. But, as we'll see in the next blink, those arguments suffer from fundamental problems of evidence and logic.

The brain is a product of evolution, and the possibility of free will comes built-in.

Like Thomas Nagel, the seminal French philosopher René Descartes pondered the gap between mind and matter. For Descartes, the body was a "machine made of earth," a mechanism operating under the cause-and-effect laws of physical science. In contrast, he firmly believed that he went about his life acting and making choices more or less according to his own discretion. Descartes believed in "free will." He believed this for the same reason virtually everyone believes it: because it's self-evident. We decide when to get up, when to go to bed, who to vote for, what to do with our lives and so on. Of course, we fall in line with cultural customs, obligations of work and law, etcetera, but at the very least, we can control how we regard these actions. So, Descartes wondered, where in our mechanistic body does this free will reside? Oddly, he settled on the pineal gland, a pea-sized organ that sits just above the brainstem. Descartes chose the pineal gland partly because it's an exception to the anatomical symmetry of the head. These days, for many supporters of the theory of evolution, free will is not only absent from the pineal gland, free will simply doesn't exist. The argument goes like this: Your thoughts and actions are neurons firing in your brain. The neurons are firing in response to stimuli, and the way they fire is the result of billions of generations of evolution. Free will doesn't enter into the causal chain of why you do what you do. This

argument, which the neuroscientist and philosopher Sam Harris made in his book Free Will, has the ring of logic, but it leads to some difficult paradoxes. For one, Harris cannot account for why someone without free will would make an argument for the absence of free will to an audience which doesn't have the free will to either accept or reject the argument. A deeper paradox is that if we accept that our thoughts are predetermined by evolution, then our thoughts on both free will and evolution are predetermined. If this is so, how can we evaluate the validity of either free will or evolution? Determinism, as Harris's position is often called, has another problem. The brain doesn't appear to behave in a predetermined manner. For instance, neurons fire in response to electrons and ions. But the movement of electrons and ions is unpredictable. Also, synapses, those neuron connectors, change rapidly. Neurons change, as well. A neuron that fires in response to stimulus can fail to respond to the same stimulus milliseconds later. Our brains are certainly a physical product of evolution. It follows then that the lack of predetermined behavior is built-in. At the very least, free will is a potential part of the brain, even if this freedom doesn't sit in the pineal gland.

An understanding of evolution can imbue our life with meaning.

If you were a Londoner in 1803 with an interest in anatomy, you might have chanced upon a strange demonstration led by an Italian physician named Giovanni Aldini. Aldini was a practitioner of galvanism, the study of biological electricity. That day he'd gotten his hands on the cadaver of an executed criminal, and in front of an audience, Aldini touched the dead man's face with conducting rods, sending electricity into the body. Aldini had experience. He made the dead man's eyes open and close. He made him kick. He made the man's jaw quiver as though to speak. We can imagine that the audience felt uneasy as Aldini, shock by shock, seemed to show that life is a meaningless reaction to outside forces. Human life through evolution is neither inherently meaningful nor meaningless. As we've seen in these blinks, the science of life doesn't require us to see ourselves as unexceptional, unfree, and unimportant. We've lost our creation myths but inherited an epic tale, eons in the making, in which life coalesced on a small planet and, at least in one imperfect species, became aware of not only its own origin but also of the origin of the universe itself. Since then, we've altered our own planet, ushering in an era known as the Anthropocene, the age of mankind. For better or worse, humans have unprecedented power. If we embrace what makes us special, our capacities of awareness, reason, imagination, creativity, choice, and cooperation, we may rise up and meet the responsibility that we've set for ourselves. We may ensure that the epic tale of our evolution goes on.

Final summary

The key message in these blinks is that: Evolution produced humanity and gave us capacities for reason, consciousness and free will. Our natural origins don't degrade us, but instead have made humans a unique and impactful species. And here's some more actionable advice: Beware of evolutionary overreach! Evolution is a powerfully illuminating theory, and it's tempting to draw conclusions between what we observe in others and ideas about our biology. But be careful. We know very little about prehistoric Homo sapiens, and finding genetic corollaries to human behavior isn't yet possible.

Keep this in mind the next time a headline appears in your news feed about the evolutionary reasons why, for example, men in red cars break the speed limit.