Preface

Why do humans look the way we do? It seems like we know a lot more about why other animals look different from each other. From numerous studies we have a good understanding of many animal characteristics—the giraffe's long neck, the digging claws of animals that burrow underground, stripes on zebras, the bright colors or camouflage of many insects and birds, the colors and patterns on flowers, and many others. But we seem to have less of an understanding of many human characteristics. Why are we bipedal when most other animals walk on four legs? Why don't we have fur all over our bodies like our closest relatives, chimpanzees, bonobos, and gorillas?

A number of books have discussed the origin of human characteristics and behaviors that are not evident from fossils, and most of these have focused on human sexual characteristics. The most well known include early books such as *The Naked Ape* by Desmond Morris and *The Third Chimpanzee* and *Why Is Sex Fun?* by Jared Diamond. More recent works include Alan Dixson's *Sexual Selection and the Origins of Human Mating Systems*, Peter Gray and Justin Garcia's *Evolution and Human Sexual Behavior*, Matt Ridley's *The Red Queen*, Robert Martin's *How We Do It*, and Robin Baker's *Sperm Wars*. These books discuss some of the same questions I address concerning human sexuality and the origin of our unique traits; however, much has changed in recent decades, and we now have access to a large amount of information—especially in the area of human genomics—that was not previously considered. In this book I provide novel insights into the origin of our unique characteristics, appearance, and behaviors, including the origin of human mating systems (i.e., monogamy), bipedalism, the lack of fur over most of our bodies, bulbous breasts in women, female orgasm, penile morphology, sperm competition, homosexuality, sexual and gender identity, altruism and cooperation, and much more.

While some other books purport to discuss the evolution of human traits and behaviors, all of them draw heavily on studies conducted in modern societies. We know that characteristics unique to any species are usually adaptations to their native environment, so it's confusing that other authors have not considered the conditions faced by our ancestors. It's harder to understand our own evolution when we only consider our modern environments, which are very different than the habitats where our unique characteristics originated—the dry forests and savannas of eastern Africa. Behavioral ecologists understand that the behaviors of captive animals are not the same as animals' behaviors in the wild.

In many respects, modern humans living in industrialized nations are captives in artificial environments they have created for themselves. This is not universally true, as many societies around the world do not enjoy the comforts of modern structures and technologies and, consequently, expected lifespan is much shorter. People living under these *more natural* conditions seem well adapted to their environments, but the same is not true for people who live with technologies that buffer them from the forces of nature; *their behaviors and physical characteristics seem out of place. The form of their bodies and the features that define all of us as humans developed over millions of years, but without a natural context, it is difficult to understand how selection led to our modern appearance and behaviors.*

In this book we explore aspects of human evolution that are not usually discussed in textbooks or biology classes. We know much about our history from bones and DNA, but these studies do not really tell us about the appearance of our ancestors and the origin of characteristics that are not preserved in the fossil record—the fleshy parts and behaviors of our ancestors. We can gain insights into our evolution by understanding the pressures of natural selection that our ancestors experienced—by viewing our species as an evolutionary biologist would. Evolutionary biologists are interested in the processes of evolution—the forces that shaped our ancestors and led to the unique appearance and behaviors that we have inherited.

It's difficult to imagine how challenging life was for our early ancestors. The hot and dry savannas of eastern Africa were harsh, and death from predators and disease was common. To understand how our appearance came about, we need to evaluate how each characteristic helped improve the fitness of our ancestors; their survival, and reproduction. Everything that makes us different—from bipedalism and loss of body hair to the enlarged breasts and buttocks of women, our social structures and behaviors, and the transmission of knowledge and skills through cultural evolution—contributed to improved survival and reproduction and the spread of our ancestors across the globe. In this book we analyze the characteristics and behaviors of humans in their natural habitat, just as we would any other species. By applying the principles of evolutionary biology, we develop a framework through which to understand our history and the origins of our unique appearance and behaviors.

To facilitate an understanding of the origin of human traits, I draw upon evidence and inferences from fossils, genomics, phylogenetics, coalescence theory, analyses of calcium isotopes, and the anatomy and physiology of our ancestors and other animals. I interpret these observations in the contexts of comparative biology, natural and sexual selection, evolutionary constraints, inbreeding and inclusive fitness, and genetic and cultural evolution. The story of our past that we piece together provides a novel view of how savanna habitats favored a unique

set of adaptations including bipedalism and the loss of fur in our early australopithecine ancestors. Other characteristics such as bulbous breasts, female orgasm, monogamy, large penis size, cooperation, and exclusive homosexuality were outcomes of our infants becoming increasingly underdeveloped at birth (altricial) as head size increased and cooperation was favored by inbreeding and inclusive fitness in the clans of our *Homo* ancestors.[1] We end this discussion in the last chapter by examining how different traits interact and sometimes have cascading effects as one trait leads to another. We evaluate the role of cultural evolution, which led to selection for larger brain volume, as the transmission of skills and knowledge became increasingly important. The results of this exercise provide a comprehensive view of the origin of our unique appearance and behaviors.

Not all readers will appreciate the approach I have taken to understand the origins of our species and, generally, the origins of life on Earth. One of the most outstanding characteristics of humans is our immense capacity for imagination. We often find fanciful and implausible explanations of phenomena and events much more attractive than those offered by science. Our leanings toward the phantastic are buoyed by an expansive diversity of science fiction literature, movies, and series; some of which have become intrinsic to the cultures of many of our societies (e.g., *Star Trek* and *Star Wars*). It is often more exciting to imagine a fictional origin of our species than to consider the hard facts and logical explanations that science has to offer. My suggestion for readers is to retain your imaginary and fantastic views of the origins of life across the universe while appreciating the account I offer as one that is grounded in factual information and the logical arguments of science.

Dry descriptions of facts and analyses of characteristics can create a detached view that falls short of the deep appreciation of the challenges that our ancestors faced. Since it's sometimes easier to build understanding through storytelling, I've included the story of a fictional character who lived perhaps 70,000 years ago. The episodes of her life help illustrate how the characteristics and behaviors of early humans contributed to their survival. At the beginning of each chapter, vignettes set the context for our exploration of why we look and act the way we do.

[1] Species in the same genus, *Homo*, that pre-dated the origin of *Homo sapiens* (abbreviated as *H. sapiens*), for example, *Homo neanderthalensis* for Neanderthals.