

primal

human 2.0



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**Mikkell Hofstee**

# primal human 2.0

**How your ancestral genes  
affect your behavior today**



UITGEVERIJ WATER BV, AMSTERDAM

everything  
of value is  
defenceless

Lucebert (1953)

i can resist  
everything  
except  
temptation

Oscar Wilde (1917)

i am what i am  
because of  
who we all are

Ubuntu, traditional African philosophy and world view

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# preface

Congratulations, you've just acquired an incredibly special book.

Mikkel Hofstee offers us not only a glimpse into our conscious and unconscious doings—however deeply confrontational it is at times—but also projects our (mis)behaviour and feelings onto the evolutionary origins of our species. It's a fascinating quest for the survival techniques, strategies of sexual selection, and ways of living and working together from thousands of generations of ancestors.

The surprising thing of this journey is that there are many similarities with the animal world that surrounds us. Our common ancient roots dating back millions of years are closely linked; a formula for success that goes back dozens of millions of years. Those couple of generations of making hand axes, shooting bows and arrows, printing books, and sending emails are nothing but a ripple in the evolutionary history of our species.

In this book, Mikkel Hofstee shows us that we're still being led and governed by genetically fixed ancient mating rituals, behavioural patterns, and survival mechanisms, and that we must honour our inner primal beings.

Dr. Maarten Frankenhuis  
Former Director of Artis Zoo

## Epochs

Miocene	23 to 5 million years ago
Pliocene	5 to 2.5 million years ago
Pleistocene	2.5 million to 13,000 years ago
Anthropocene	starting 13,000 years ago (this term is still under discussion)

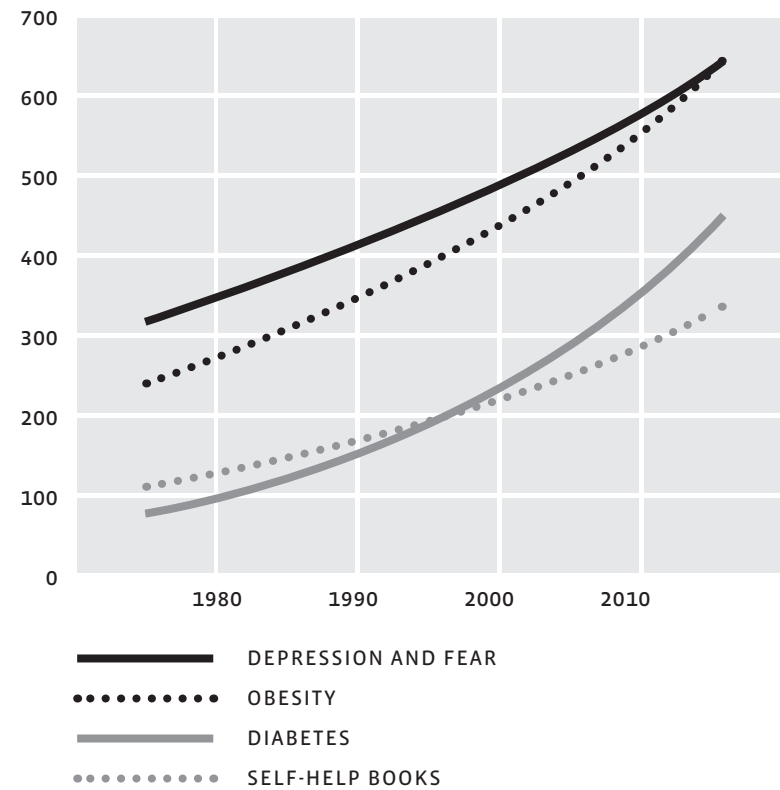
## The family tree of humanity

4.5 billion years ago	Formation of Earth
3.5 billion years ago	Development of first microorganisms
About 600 million years ago	Development of multicellular organisms
65 million years ago	Extinction of dinosaurs
10 million years ago	Common ancestor of man and chimpanzee
5 to 7 million years ago	Appearance of first hominins
5 to 3.5 million years ago	Australopithecus phase
1.5 to 2.5 million years ago	First Homo species (H. habilis, H. erectus, H. georgicus, H. antecessor)
1 million years ago	Homo heidelbergensis
About 300,000 years ago	Neanderthals
About 200,000 years ago	Homo sapiens
13,000 years ago	Start of agricultural societies

### Population growth

4.5 billion years ago	formation of Earth
150,000 years ago	1 million hominins
100,000 years ago	at least 6 types of humans: Homo erectus, H. denisova, neanderthals, H. soloensis, H. floresiensis en H. sapiens
11,000 to 12,000 before Christ	5 to 8 million nomadic hunter-gatherers
100 AD	only 1 or 2 million nomadic hunter-gatherers left (mostly in Australia, Africa, and America, but 250 million farmers. They used a small part of the Earth's surface (2% in 1400 AD)
1700	700 million inhabitants
1800	950 million inhabitants
1900	1,6 billion inhabitants
2000	6 billion inhabitants
2017	7 billion inhabitants
2025	8 billion inhabitants (forecast)
2050	10 billion inhabitants (forecast)

### Illnesses among the global population (millions)



I MADE UP THE SELF-HELP BOOKS, BUT THERE'S UNDOUBTEDLY A GRAIN OF TRUTH IN IT.



surprise and  
admiration

Not that long ago, maybe about 10 years ago I think, before a meeting, most people would have a little chat with one another about the weather, the weekend, or about their family life. Nowadays, many people grab their phones and silently wait for the meeting to start, their entire attention consumed by their device.

Our children have phones from a young age and we absolutely love that. Can you imagine not being able to contact them? When we were young, we were allowed to play outside—go into the woods on our own—as long as we made sure to get home before dark. Now, this absolutely terrifies us—our children should never be too far from home and, in any case, they should have their phones on them.

One of our favourite hobbies: sitting on the sofa all together with a bag of crisps. Go ahead and compare that with our ancient ancestors. Hundreds of thousands of years ago we would be busy all day finding food and preparing it. Now it is available in abundance everywhere, we can gobble it up immediately, and it is gone after chewing three times. We are no longer being challenged to move our bodies. Why would we, with such a well-stocked fridge?

These are just a few examples of our modern behaviour. Baffled, I look around, and more and more I get the feeling that we weren't made to live the way we're living these days, that we are moving too far away from our human

nature and are being put off our natural balance. Just think about the disruptions to our biological clocks from artificial light—potentially one of the most unnatural processes of modern times. The hysterical emphasis on hygiene isn't favouring us and our internal selves either. Yet, we continue to display this behaviour, even though we know that all of this screen-time, fear, excess food, and a sedentary lifestyle are no good for us. We're consciously letting ourselves get locked in by prosperity with its abundance of stimuli. How is this possible? You could almost say that we have been programmed incorrectly—for unhealthy, unnatural behaviour.

Over the last fifteen years, I have been promoting healthy behaviour in the workplace. With my company, Lifeguard, we help employees become more resilient, energetic, and motivated. In all those years, I have noticed how many people are struggling with their existence within modern society. You are probably familiar with all of these: high percentages of burnouts (especially in young people), mental health issues, obesity, and cardiovascular diseases. Our whole society is suffering, because even though we're living longer, we're living for more years in bad health. Instead of health care, we should call it sick care, and the costs are increasing at an alarming rate.

Without wanting to quash all progress—I absolutely love innovation—I can only arrive at one conclusion: our ancient genes can't handle this. Almost unnoticed, they're being manipulated into extremely unhealthy behaviour, not only physically, but certainly also mentally. When tackling these issues, we are focusing on the effects of this manipulation: we're worried about obesity, the fact that our children spend too much time on their phones, the use of medication, and that employees lack commitment. This way, we're only fighting the symptoms; the causes are much more deeply rooted. We need to go back to our genesis and understand why we are so easily tempted into this unhealthy behaviour.

I've delved into this in recent years and have linked my professional experience in behavioural change to knowledge from evolutionary psychology, biology, anthropology, and archaeology. I'm not an expert in any of these fields, but with this book, I mostly want to show you how we are programmed and how these old genes behave in our new world. This is how you'll understand why it's so hard to resist everyday temptation, and that our genes aren't to blame, but that our modern way of life is the culprit. For example, when you think about our ancient response to danger, we were immediately in 'on' mode. The irony of evolution is that it's precisely our physical response to (potential) danger which has allowed us to survive that is now the biggest killer on earth: stress.

There's nothing wrong with our genes. Besides, we're not going to change them anytime soon, so we might as well make them feel good. And we should also be a bit more humble in regard to our dating back millions of years. The last ten thousand years of history is not much more than a layer of varnish. When we scratch ourselves just a little bit, for example if we're under pressure or tired, it brings

up the genetic properties that we needed so badly when we were cavemen. Genetically, we aren't very different from hundreds of thousands of years ago, but the environment has most certainly changed, which means our behaviour has a different effect.

In this book I'd like to show you how wonderfully we have developed—and how incredibly functional our genetic properties were. My quest has filled me with wonder about our incredible body with all of its complex interactions. We are all successful mutants, evolved from primal human.

- \* The time that we were hunter-gatherers and roamed the steppes began from approximately 2 to 3 million years ago up until about 13,000 years ago. Our origins probably date back even further, with the first hominins appearing about 5 to 7 million years ago. By the way, I'm using the word cavemen, primal man, and hunter-gatherer interchangeably. I know that we refer to our ancestors as hunter-gatherers nowadays, but a bit of variety in vocabulary might be pleasant.

**i our  
incredible  
body**

About why; you could skip this chapter; you're the CEO of your own body; have a mega-computer at your disposal; your hormones are addictive; you love hugging; you're always hungry with a penchant for sweet, salty, and greasy foods; you hate changing; and why it's not a bad thing to have juvenile characteristics.

You can skip this chapter. Perhaps this isn't the best opening line, but it actually increases the chance that you are going to read this text. That's just how we work: as a species, we're naturally curious. If you tell us that we're not allowed to do something, we at least want to know what it is we're not allowed to do.

Curiosity was an important survival mechanism in our history. It provided our species with discoveries, and helped us learn about danger and how we could adapt to it.

Genetically speaking, we're still close to the human from over a hundred thousand years ago. It's a good thing to check and see what's under that thin layer of varnish from a few thousand years of civilisation. We're all successful mutants: products of evolutionary processes. Our DNA has adapted itself successfully, for millions of years, from generation upon generation. That's why it's useful to look at how we evolved and to really examine the functions of those adaptations. This chapter is about you and your body: your DNA, your hormones, and your brains. I'll limit myself to the 'parts' that influence your behaviour, without trying to include everything. If you want to know how you're being tempted into unhealthy behaviour every day, it's useful to have some basic knowledge of your body. What you want to avoid is that feeling you sometimes get when you take your car in for repairs: that the garage owner could tell you anything and you wouldn't know whether it was true or not.

## Successful mutants

I must confess that I am a fan of Star Wars—the multitude of strange beings is wonderfully portrayed in George Lucas' films. It turns out that fantasy films containing other intelligent beings that can also speak are popular. On Earth, we're the only successful human mutants. But it takes hundreds of generations before a successful mutation or genetic variation has finished evolving. Only the reproductive cells pass on hereditary properties, which can contain characteristics that determine not only variation, such as your eye and hair colour and shape of your nose, but also genetic properties. The genetic properties that are passed down are there first and foremost to increase the chances of reproduction and not specifically to keep us healthy. Health is a prerequisite for successful reproduction: since healthy humans were more successful with reproduction, the healthy genes of those humans have been passed down through evolution and we are their descendants. Natural selection.

## The most complex factory in the world

Our bodies consist of about 40 billion cells, besides another 160 billion brain cells— an incredibly large amount. All these cells are tiny machines where chemical processes are continuously taking place. When you look at videos of them, you'll see that it truly looks like a real factory: something is constantly added to, produced, and carried off in each cell. Look for *The Inner Life of the Cell* on YouTube and you'll see an incredible animation by Harvard University about the activities within a cell. You'll be amazed! Watching this, you could say that there are all sorts of self-directing teams with a lot of connection and

communication between them. We're always astonished by ants and how all those little creatures work together and communicate— but that pales in comparison with the operation of our cells.

How those cells work depends on our DNA, our genetic code. Our DNA consists of about 25,000 genes that are responsible for all sorts of functions in our bodies. Biomedical doctor Mark van Mil expertly explains exactly what DNA is in his videos for the Universiteit van Nederland. (Search for *Mark van Mil* and DNA on YouTube.) He compares our DNA with a music roll in a mechanical organ: the holes in the paper create a certain melody. This is also how our DNA (our body's music roll) works. The genes in our DNA have a certain code—the hole in the music roll—and these are read by the cell they're located in, as it were. This way, they control the production processes within the cells in order to produce certain proteins which, in turn, lead to characteristics or behaviour. This is how our DNA gives orders to our cells: for them to make muscles contract, convert oxygen, or burn glucose. But also, in an earlier stage, what type of cell they should become: a brain cell, blood cell, or lung cell. But beware: the type of 'mechanical organ' and the speed with which the music roll is being passed through it will determine how the music sounds. It sort of works the same way with us humans.

## One big family

Our DNA is only 0.1% different to that of other human beings, and only about 2 to 3% different from chimpanzees. Apparently that's enough for the countless differences amongst humans, and between us and the other most closely related creatures. But for humans, that 99.9% that we have in common is essential for our being

human. This knowledge means that there is only one human race and not several, as has been claimed in so many wars. That makes us unique, because animals have all sorts of species, as in the case of apes and dogs. And the fact that we're 99.9% the same also seems to indicate that we could all be traced back to about 600 original ancestral mothers: we're all related to some degree.

### The most impressive computer in the world

For me, neuropsychiatrist Theo Compernelle has best illustrated how astounding our brain is in his book *BrainChains* (2014). He calls the world wide web 'peanuts' in comparison to our brain. Our brain has about 80 billion neurons (nerve cells) that all work like a tiny computer and send chemical signals to other cells through neurotransmitters, the messengers of these signals. At the same time, the nerve cell also receives all sorts of information. In addition, neurotransmitters can activate all sorts of hormones, which I'll expand on later.

Apart from nerve cells, we also have around 80 billion glial cells in our brain which assist in cleaning it, something that's especially important while we're asleep. Scientists also believe that glial cells play an important role in transferring information.

Those 160 billion brain cells all have between roughly 1000 and (over) 200,000 connections. This leads to a network of 80 trillion (80.000.000.000.000) 'continuously changing connections', as Compernelle describes it. He also indicates that, 'if we were to build a real-life model of our brains as a computer, it would be as big as the largest airplane hangar, weigh 40,000 tonnes, and would use the electricity of 3 to 4 nuclear plants. This computer force in humans only weighs

1.5 kilos and uses 30 watts.' This comparison touches me deeply because we often treat our brain so carelessly, and we think it's normal that everything just works the way it does.

Let's look at how this amazing brain has developed, and how it has adapted over time.

### From reptilian brain to a brain with a cockpit

Approximately 200,000 years ago, we emerged as human beings (*Homo sapiens*) from the *Homo habilis* (2 million years old), the 'handy man', a reference to the fact that this species of hominin was able to use tools. Also see our 'family tree' on page 13.

We were more successful than the Neanderthal, which went extinct. Nonetheless, the Neanderthal had a slightly larger brain than we do (1500-1600 cc vs. 1400 cc). So it seems like a larger brain isn't necessarily a smarter brain, which we already know from looking at animals (an elephant has a brain volume of 5 kilos). Although more intelligent is naturally a definition used by us, human beings, it seems that it is especially the structure of our brains that has led us to become the dominant species on this planet at this moment in time. I am saying 'at this moment' on purpose, because compared to the origin of the Earth (around 4.5 billion years ago), as a species we're still only just a mayfly.

Despite this comparison: we now act like the rulers on Earth, and that is thanks to how our brain is structured. Our brain is made up of three layers that show a direct link to our development as human beings. I'm following an old theory here from 1949, from the American neuroscientist Paul MacLean, because his theory about the structure of the brain includes the link with emotions. For this book that