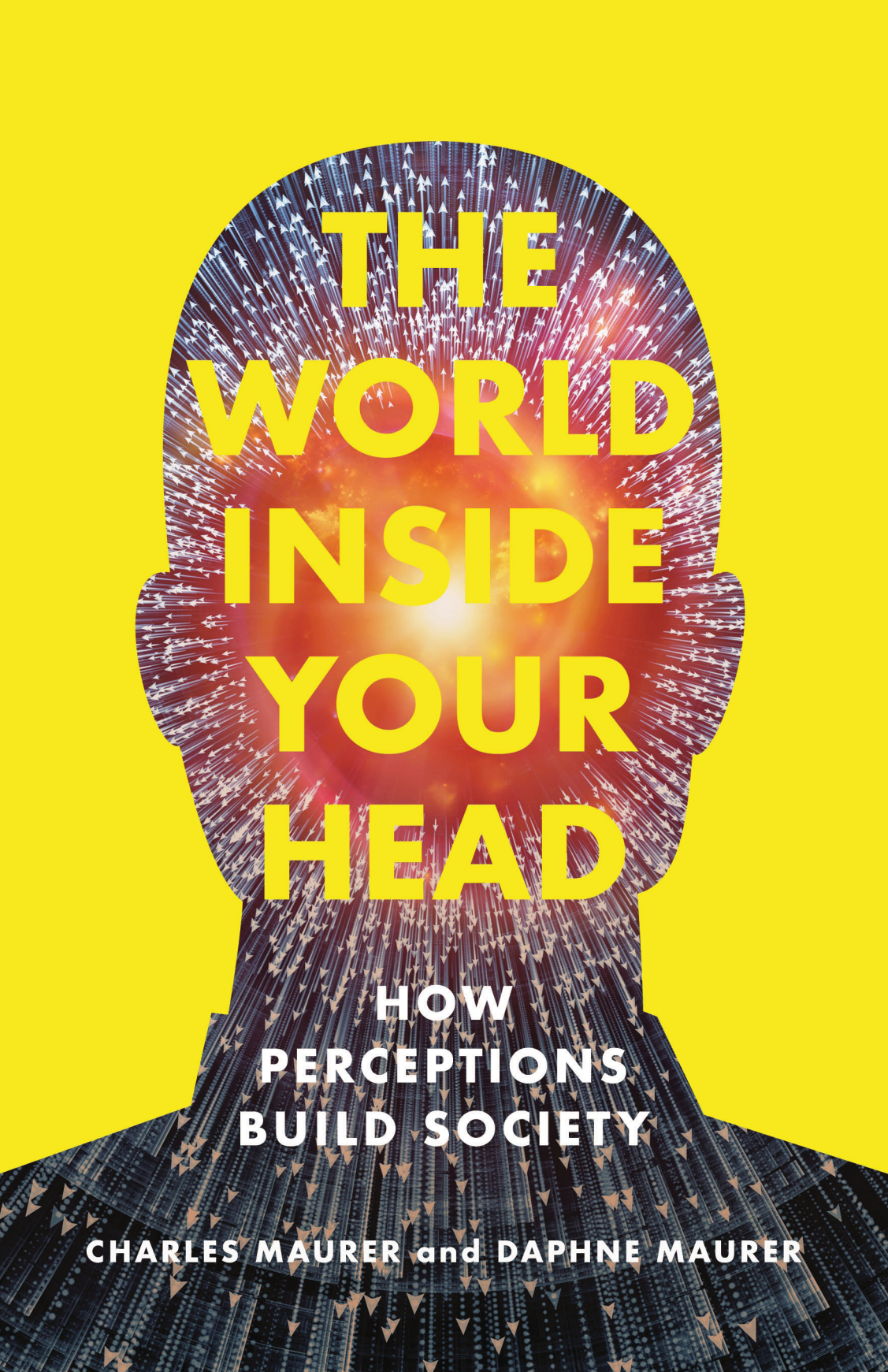




THE WORLD INSIDE YOUR HEAD

**HOW
PERCEPTIONS
BUILD SOCIETY**

CHARLES MAURER and DAPHNE MAURER

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Horace pointed out that even Homer sometimes nods.

*We would like to dedicate this book to Homer,
for setting the precedent.*



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THE WORLD INSIDE YOUR HEAD

1

STARTING POINTS

People saw the man in many ways. His adult children saw a loving grandfather. His wife of fifty years saw a loving, loyal husband—they were always together outside working hours—but she did not see the pleasures he might take during the day with other women. Friends and acquaintances saw him as reserved but affable and witty. Employees saw him sometimes as a sympathetic boss and sometimes as a bully. Charities saw him as generous, and several appointed him to their boards of directors. People saw him as a titan of Wall Street, as a man who was instrumental in breaking the New York Stock Exchange's monopoly on trading and who ran the most active stock exchange in the country. Most of his peers perceived in him such probity and competence that three times they elected him president of the Nasdaq Stock Market. Several times he testified at congressional hearings, sitting alongside the president of the New York Stock Exchange and the chairman of the Securities and Exchange Commission. However, some investors saw his claims as too good to be true, and then, overnight, everyone saw him as the greatest con man who ever lived. Although Bernie Madoff's stock-trading firm was a commercial paragon, they learned he also ran a phony investment

fund that never bought nor sold a single stock yet “earned” tens of billions in imaginary profits, “profits” that anyone could share in for a price.¹

Investors in that firm included his own extended family. He insulated his wife and sons from the fraud—it seems certain that they knew nothing about it—but everyone else he deemed fair game, including the charities he supported. Now people saw him as a different kind of financial wizard, as a magician on stage: His phony firm was a top hat that the audience kept filling with money because he claimed that any money in the hat would multiply forever. However, the money multiplied only inside his pockets when he took banknotes from the hat unseen. This was a classic Ponzi scheme: Pay earlier investors by taking money from later ones, assuming you can continue forever.

Madoff got away with his fraud for decades because, like any magician, while on stage he manipulated his audience’s perceptions. One of Madoff’s biographers wrote:

I saw his magic in action during our first interview. All through our conversation, he deftly complimented my grasp of market history and arcane investment strategies. With small gestures and smiling approval, he made it clear that I was the most intelligent reporter he’d ever met. And I can report that it felt great—although I already knew he was a liar and a fraud! I can imagine how potent his charm must have been when people still thought he was a genius.²

However, Madoff did not live his entire life on stage. Fifty years in a close, successful marriage—that could not have been a fraud. Madoff certainly hid things from his wife. She knew of no other woman nor of his phony investments. Neither did his

sons, who worked with him in his legitimate business only. His personality varied with his situation and society just as everyone's does. Some of our friends enjoy irony, so we enjoy ribbing one another; others are literal-minded, so they keep us serious. This does not show we are jocular but sometimes pretend to be serious, nor that we are serious but sometimes pretend to be jocular. It shows that we are able to behave in different ways, and in any given situation we behave as our perceptions of the world have taught us is appropriate—which often includes lying. No matter how much we dislike a meal, as dinner guests we always compliment the cook.

Even the paragon of honesty told lies, George Washington. When Honest George lived in Philadelphia as president, he feared that Pennsylvania would free any of his slaves who spent six months in the state, so he instructed his secretary to send them back to Virginia. "It is my wish and desire that you would send the whole, or such part of them as Mrs. Washington may not chuse to keep, home . . . under pretext that may deceive both them and the Public."³

Madoff may have lied unusually well but that is unlikely. At least in anglophone society, almost everyone's lies are difficult to detect. Charles Bond combined the data from 206 laboratory studies that involved attempts of one person to fool others. Each study repeatedly asked an equivalent of "Is this a lie? Yes or no." He found that people identified lies from truth just 4 percent more accurately than they would have by flipping a coin: 54 percent of the time instead of 50 percent.⁴

Madoff's days revolved around his family, his friends, and his two businesses. Of those four orbits, only one was a fraud. That fraud was monumental—marks sent him more than \$20 billion—but he did not commit it by himself. Madoff listed 13,735 clients of his own, but those included many financial

institutions that funneled money from other marks—from more than 900,000 others, 98 percent of whom were outside the United States and usually had no idea where their money was going. Virtually all of those institutions were reputable, but they earned too much from Madoff in commissions to want to exercise due diligence on his claims.⁵

In sum, Madoff was a human being who lived and worked with other human beings. His early experiences with people gave him the means and knowledge to become an outstanding businessman and then led him—with the aid of thousands of other businessmen who knew or should have known better—to execute a mammoth fraud. However, a genius at planning he surely was not. His legitimate business earned him \$40 million dollars per year plus infinite respect—this he well knew—yet he went about his fraud knowing that an auditor needed to make only one quick phone call to catch him out. His books showed innumerable trades of stock, but all of them were fictional. All an investigator needed to do was pick a trade—any trade—then call the supposed counterparty to confirm it.

Psychological explanations of Madoff's behavior are many and varied, but all of them ascribe his actions to some form of defective socialization. That is because conventional psychology assumes, implicitly or explicitly, that sociality is fundamental to—a basic element of—human behavior. However, a moment's thought shows this cannot be. To relate socially with people, your brain needs first to sense and perceive them. This means that social relations cannot be elemental; they must be formed by sensations and perceptions. To understand Madoff's actions, we need to know what he perceived.

That approach to psychology is what this book is about. We are going to show how perceptual functions of the brain—rudimentary functions—combine at different scales to control how

we react to and deal with other people, both individually and in groups of different size.

We shall deduce nothing in this book from any philosophical or psychological theory. Instead, we shall take for granted proven principles of physics and biology, then extend those to behavior using experimental data from behavioral sciences, sciences as solid as (although, of course, far less precise than) the physics and astronomy that saw men reach the moon. Our inferences from those we shall confirm with examples throughout recorded history and across the globe.

This amounts to rethinking all of conventional psychology. We believe it will be useful, and we know it will be surprising. Whatever beliefs you hold—*whatever* beliefs—you can expect to read of scientific evidence gainsaying some of them. If you prefer comfortable belief to hard reality, this is not a book for you.

MISE-EN-SCÈNE

We began stewing about this subject in 1980, when we started work on a book about how babies perceive the world: *The World of the Newborn*. For that book we read every scientific study of newborn babies that had been published in English, French, or German, and translations of others, then we worked out from those data what a baby sees, hears, thinks, feels, and so on. This seldom resembled theoretical treatises, so we learned to ignore grand theories and concentrate on facts.

In 1988, after the book appeared, we extended our thinking to adults. We asked ourselves how people come to perceive the world as we do—or rather, how brains inside bony boxes come to perceive a world outside those boxes. As a scientific

equivalent of synecdoche—a part's representing a whole—we chose the question of how people (and other animals) form esthetic preferences. This proved to be a much larger project than the baby book. It involved integrating so much material that thirty-two years passed before we saw it in print. *Pretty Ugly* is its title.

The World Inside Your Head applies what we learned from *Pretty Ugly* to a broader subject: people interacting with other people. Since our first book took eight years and our second took thirty-two, we feared this one might take 128. We considered asking the pope for a special dispensation to finish it, but we decided that shortening it might be more practical. To do this we are summarizing a lot of evidence rather than dwelling on details—converging evidence, to avoid being fooled by incidental results. We are not listing all of our sources—if we did, the endnotes would be longer than the text—but if you want to dig deeper somewhere, a note will show where to place your shovel.

When writing each of these books, we have found it essential to avoid psychological jargon. Jargon feeds thinking into pre-existing pathways, nearly always theoretical pathways that lead to dead ends. On top of that, psychological jargon is largely arbitrary and often confuses even psychologists. Academic papers are filled with arguments about what one or another term means. We do know how to write in jargon—Daphne has published hundreds of academic papers—but in this book we are sticking to plain English. Some of the material is confusing enough.⁶

For clarity, we are also sticking to one conventional usage of genders and pronouns: The archetypical parent will be the mother and, to contrast with her, the archetypical child will be

her son. On the other hand, “we” may refer to either or to both of us, and it will often refer to you as well as to ourselves. Also, virtually every scientific study has multiple authors, but we do not want to obfuscate the text with lists of names, so we shall mention the first author only. Read an implicit et al. after every name and see the endnotes if you want to know who the other authors are.

To maximize accuracy, we are avoiding false precision. People assume that more decimal places mean more accuracy, but the opposite is commonly the case. For example, at this moment Google Maps is telling us that to drive from our apartment in Toronto to New York City would take us eight hours and sixteen minutes—8.27 hours. This number is precise but nonsensical. There is no way to predict traffic so precisely, especially in and around large cities. It would be nonsensical even if “New York City” were a point rather than a large area. If Google were predicting that driving to Times Square will probably take eight to nine hours, then their prediction might be accurate, but 8.27 hours is almost sure to be wrong. To avoid the inaccuracy of excess precision, we shall round off most of the numbers we report. If you want to know an exact number, you will find an endnote providing the reference to every study we describe.

NATURE VS. NURTURE: A FALSE DICHOTOMY

When people try to explain behavior, either human or animal, usually they first consider whether the behavior is innate or learned. Ancient Greeks did this, and doubtless earlier peoples

did too, although the theoretical bases have changed. Nowadays we see innate behaviors not as formed by a deity but as “wired” into the nervous system by genetics and evolution. Dogs evolved to hunt rabbits; rabbits evolved to fear dogs.

However, neither nature nor nurture can explain the behavior of a rabbit and a large dog we once knew, both pets of a friend. Those animals did not live together—the rabbit lived with another rabbit in a cage—but the rabbit and the dog enjoyed chasing each other in the garden, running after each other in turn.

Nor can they explain the behavior of Sadie and Max. Sadie was a dog we once owned, a blonde, hairy, medium-sized mongrel. She had been spayed while young, yet she actively mothered Max, a black kitten. Max sucked on her teats while Sadie licked him. This they did for much of every day, leaving Max a dripping mop.

In many people’s minds, nature vs. nurture is a distinction fundamental to the subject of this book, but innumerable confusions like those examples show it to be arbitrary and unhelpful. We would like to finish this introduction by showing why nature vs. nurture is not a useful distinction, although congenital differences certainly are real.

Two thousand years ago, paper did not exist and papyrus was precious. When you learned your letters in ancient Rome, your exercise book was a concave plank with blackened beeswax filling the hollow. You called this a *tabula*. To write on it, you scratched the wax with a pointed stylus. To erase your work, you scraped off the wax then poured some molten wax back on. A *tabula* freshly prepared for writing was a *tabula rasa*. This was the classical model of the newborn baby’s mind.⁷

A few hundred years ago philosophers modernized the model to use newer technology, chalk on a piece of slate. That

is the model people use today. “Nature vs. nurture” amounts to “nature vs. a clean slate.”

The “nature” side we call genetics. A century ago doctors attributed great import to genetic attributes, and then the Nazis turned some simplistic genetic theory into a “science” of murder. This has made the modern science of genetics suspect. Genetic explanations have become socially acceptable to explain some unusual maladies, but many people find outrageous the idea that genetics can help to explain measurable differences in behavior. Indeed, a president of Harvard University was forced to resign partially because he adumbrated the mere *possibility*. Now “nurture” has become the only permissible explanation.⁸

Unfortunately—or, perhaps, fortunately—this argument is fatuous. Nature and nurture form a false dichotomy, a dichotomy that cannot exist biologically. Microscopic chemical structures that we inherit are built into bodies and brains by chemicals and energy within the embryonic and fetal environment. Without an appropriate environment, these structures cannot develop. The chemistry and physics of this system make nature and nurture indistinguishable.

To understand this, think of shoes. A shoemaker’s last embodies the shape of a shoe, but it takes leather and a cobbler to construct a shoe. If a shoe is too wide, there is no way to tell whether the last was too large or whether the cobbler shaped the leather too loosely. Moreover, “too large” and “too loose” denote nothing specific. The “correct” last and techniques are merely some combination—any combination—that produces a shoe that fits the customer.

For a real example, consider identical twins. Identical twins are built on the same genetic last, yet 10 percent of them are born with one twin more than 10 percent heavier than the other. The womb’s environment is not uniform, so their genes

encountered different pressures and the same chemicals in different amounts, so the same genes led to different bodies.⁹

“Gene expression” is the technical term for this. Most mechanisms of gene expression involve arcane physiology, but for decades our lab has been investigating one at a level that is easy to understand. A tiny percentage of babies are born with cataracts, a tangle of proteins inside the lens of the eye. If these proteins were on their skin you would see nothing of consequence, just a pair of freckles, but inside the eyes they have a serious effect: They block the passage of patterned light. This prevents the baby from seeing anything except lightness and darkness. If nothing is wrong with the eyes other than the cataracts, a surgeon can remove the cataracts, fit contact lenses, and expect the children to grow up seeing normally—but those children do *not* grow up seeing normally. We tested babies’ vision less than an hour after this treatment and have examined their vision repeatedly for decades. We have found that when both eyes had cataracts preventing normal stimulation of the brain for the first months of life, then the ears took over parts of the brain from the eyes. Those tiny bits of protein in the lens made the brain’s neuronal structures develop abnormally, which caused vision to develop abnormally in a number of subtle ways.¹⁰

What causes cataracts we do not know. Congenital cataracts tend to cluster in families, so we can assume that part of the cause is genetic. Thus we can say that (1) some genes (2) in some fetal environments (3) induce cataracts to form. Those cataracts (4) prevent images of the world from being cast onto the retina, so (5) the retina sends abnormally little stimulation to the brain, which (6) causes chemical structures within the brain to develop abnormally, so that (7) the ears feed parts of the brain normally fed by the eyes. This is clearly not nature vs. nurture.

If we add behavior to this, complications multiply. Throughout one lunar month every year, observant Muslims forgo food and drink during the day. This is the fast of Ramadan. Census data from Uganda show that when a woman bears a child in the ninth month of Ramadan, her child is 20 percent more likely to be born with or to develop some form of blindness, deafness, mental illness, or learning disability than if she had given birth at any other time of the year (although the chance of this happening is still low). The lunar month of Ramadan travels through the solar year, so the season is not a factor. The difference must have been some combination, during her first month of pregnancy, of (1) the embryo's genetic reaction to (2) her body's genetic and learned reactions to (3) fewer calories than usual and/or to (4) her eating and drinking at nonhabitual times. (Note that pregnant women are not obliged to fast, but few women know they are pregnant during the first month.)¹¹

Although those statistics apply to a cultural practice, comparable natural events have dogged human history. Crops fail frequently and food stores tend to run low before a new harvest comes in.

RACE

Partly because nature and nurture are inseparable, notions of biological race are meaningless. For example, consider this observation from 1896:

The lower jaw of the early negro in the South was unusually large. The intermixture of white blood has decreased the size of the jaw until, where there is but a slight admixture of negro

blood, the jaw is as delicate-shaped as that of the whites. In the evolution of the race the lower jaw becomes smaller.¹²

Certainly genes influence a jaw's size and shape, but those genes interact inextricably with the jaw's environment. Every human being shares some generic, animal biochemistry that reacts to continual, heavy loads by enlarging and strengthening muscles and bones. This means that the size and shape of jaws reflects the toughness of the foods that they chew. In eighteenth-century London, industrialization created softer foodstuffs than had been available, so Londoners developed smaller jaws than before. The same thing would have happened to Africans brought to the United States. Once they arrived they would have begun to eat softer foodstuffs, and as machinery became more common, their foodstuffs would have become softer still. The changes in the jaw would have had nothing to do with "the evolution of the race."¹³

People who live in one part of a continent do tend to share more genes than people who live in another part. DNA clearly shows statistical similarities within groups of people who have lived together for a long time. This is especially evident in small groups who are isolated from others, whose genes can gradually drift to differ from most of the population. The height of Pygmy tribes is the most striking example. However, those similarities are more curiosities of inbreeding than a fundamental division of mankind—equivalents of the inbred Habsburgs' protruding jaws.¹⁴

Obviously people differ in appearance, but our differences form continua, not discrete categories. Analyses of DNA show that early humans spread from Africa not as discrete branches forming a genealogical tree but as a tangle of vines growing every which way. This makes us all so similar that *Homo sapiens*

cannot be divided biologically. The races we perceive are perceptual illusions. In chapter 4 we shall expand on this and see how those illusions form.¹⁵

We all see that people look different on the outside, but a surgeon will tell you they look just as different inside, and an endocrinologist will measure different chemical balances. When these differences are extreme and unusual, we call them birth defects; when the differences are more modest but still unusual—well, as we mentioned, this depends upon the era and politics. Before Hitler, doctors thought them genetic and telling; today they call them incidental and meaningless.

That said, we suspect that at no time or place in the history of the world have *mothers* seen some of these differences as meaningless. Frank and Crank are what one mother called her babies because of their different temperaments. In 1965 Beverly Birns cemented such observations in science. Birns stimulated newborns repeatedly with noises, a cold disc on the thigh, and a sugared pacifier. She did this systematically over the first four or five days of life while trained observers watched them. Irrespective of the stimulus, babies differed in how strongly they reacted, and they maintained differences from the first day to the last. From Birns's and others' studies, it seems indisputable that people enter the world with different temperaments.¹⁶

Frank and Crank were born perceiving different environments—Frank's was nicer—and since they behaved differently, their mother treated them differently. This meant that each perceived a different mother. When babies begin life perceiving different worlds that way, different adults are likely to result.¹⁷