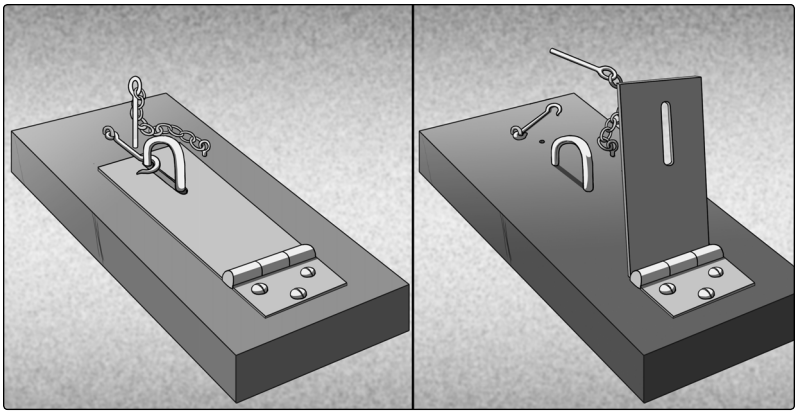
INTRODUCTION

The Puzzling Puzzles of Harry Harlow and Edward Deci

In the middle of the last century, two young scientists conducted experiments that should have changed the world—but did not.

Harry F. Harlow was a professor of psychology at the University of Wisconsin who, in the 1940s, established one of the world's first laboratories for studying primate behavior. One day in 1949, Harlow and two colleagues gathered eight rhesus monkeys for a two-week experiment on learning. The researchers devised a simple mechanical puzzle like the one pictured on the next page. Solving it required three steps: pull out the vertical pin, undo the hook, and lift the hinged cover. Pretty easy for you and me, far more challenging for a thirteen-pound lab monkey.



Harlow's puzzle in the starting (left) and solved (right) positions.

The experimenters placed the puzzles in the monkeys' cages to observe how they reacted—and to prepare them for tests of their problem-solving prowess at the end of the two weeks. But almost immediately, something strange happened. Unbidden by any outside urging and unprompted by the experimenters, the monkeys began playing with the puzzles with focus, determination, and what looked like enjoyment. And in short order, they began figuring out how the contraptions worked. By the time Harlow tested the monkeys on days 13 and 14 of the experiment, the primates had become quite adept. They solved the puzzles frequently and quickly; two-thirds of the time they cracked the code in less than sixty seconds.

Now, this was a bit odd. Nobody had taught the monkeys how to remove the pin, slide the hook, and open the cover. Nobody had rewarded them with food, affection, or even quiet applause when they succeeded. And that ran counter to the accepted notions of how primates—including the bigger-brained, less hairy primates known as human beings—behaved.

Scientists then knew that two main drives powered behavior. The

first was the biological drive. Humans and other animals ate to sate their hunger, drank to quench their thirst, and copulated to satisfy their carnal urges. But that wasn't happening here. "Solution did not lead to food, water, or sex gratification," Harlow reported.[1]

But the only other known drive also failed to explain the monkeys' peculiar behavior. If biological motivations came from within, this second drive came from without—the rewards and punishments the environment delivered for behaving in certain ways. This was certainly true for humans, who responded exquisitely to such external forces. If you promised to raise our pay, we'd work harder. If you held out the prospect of getting an A on the test, we'd study longer. If you threatened to dock us for showing up late or for incorrectly completing a form, we'd arrive on time and tick every box. But that didn't account for the monkeys' actions either. As Harlow wrote, and you can almost hear him scratching his head, "The behavior obtained in this investigation poses some interesting questions for motivation theory, since significant learning was attained and efficient performance maintained without resort to special or extrinsic incentives."

What else could it be?

To answer the question, Harlow offered a novel theory—what amounted to a *third* drive: "The performance of the task," he said, "provided intrinsic reward." The monkeys solved the puzzles simply because they found it gratifying to solve puzzles. They enjoyed it. The joy of the task was its own reward.

If this notion was radical, what happened next only deepened the confusion and controversy. Perhaps this newly discovered drive—Harlow eventually called it "intrinsic motivation"—was real. But surely it was subordinate to the other two drives. If the monkeys were rewarded—with raisins!—for solving the puzzles, they'd no doubt perform even better. Yet when Harlow tested that approach, the monkeys actually made *more* errors and solved the puzzles *less*

frequently. "Introduction of food in the present experiment," Harlow wrote, "served to disrupt performance, a phenomenon not reported in the literature."

Now, this was *really* odd. In scientific terms, it was akin to rolling a steel ball down an inclined plane to measure its velocity—only to watch the ball float into the air instead. It suggested that our understanding of the gravitational pulls on our behavior was inadequate—that what we thought were fixed laws had plenty of loopholes. Harlow emphasized the "strength and persistence" of the monkeys' drive to complete the puzzles. Then he noted:

> It would appear that this drive . . . may be as basic and strong as the [other] drives. Furthermore, there is some reason to believe that [it] can be as efficient in facilitating learning.[2]

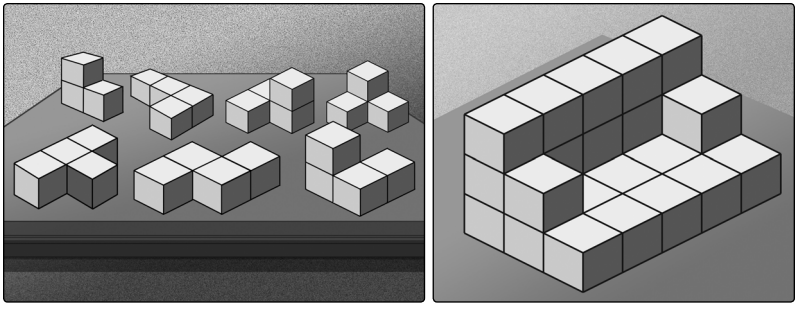
At the time, however, the prevailing two drives held a tight grip on scientific thinking. So Harlow sounded the alarm. He urged scientists to "close down large sections of our theoretical junkyard" and offer fresher, more accurate accounts of human behavior.[3] He warned that our explanation of why we did what we did was incomplete. He said that to truly understand the human condition, we had to take account of this third drive.

Then he pretty much dropped the whole idea.

Rather than battle the establishment and begin offering a more complete view of motivation, Harlow abandoned this contentious line of research and later became famous for studies on the science of affection.[4] His notion of this third drive bounced around the psychological literature, but it remained on the periphery—of behavioral science and of our understanding of ourselves. It would be two decades before another scientist picked up the thread that Harlow had so provocatively left on that Wisconsin laboratory table.

In the summer of 1969, Edward Deci was a Carnegie Mellon University psychology graduate student in search of a dissertation topic. Deci, who had already earned an MBA from Wharton, was intrigued by motivation but suspected that scholars and businesspeople had misunderstood it. So, tearing a page from the Harlow playbook, he set out to study the topic with the help of a puzzle.

Deci chose the Soma puzzle cube, a then popular Parker Brothers offering that, thanks to YouTube, retains something of a cult following today. The puzzle, shown below, consists of seven plastic pieces—six comprising four one-inch cubes, one comprising three one-inch cubes. Players can assemble the seven pieces into a few million possible combinations—from abstract shapes to recognizable objects.



The seven pieces of the Soma puzzle unassembled (left) and then fashioned into one of several million possible configurations.

For the study, Deci divided participants, male and female university students, into an experimental group (what I'll call Group A) and a control group (what I'll call Group B). Each participated in three one-hour sessions held on consecutive days.

Here's how the sessions worked: Each participant entered a room and sat at a table on top of which were the seven Soma puzzle pieces,

drawings of three puzzle configurations, and copies of *Time*, *The New Yorker*, and *Playboy*. (Hey, it was 1969.) Deci sat on the opposite end of the table to explain the instructions and to time performance with a stopwatch.

In the first session, members of both groups had to assemble the Soma pieces to replicate the configurations before them. In the second session, they did the same thing with different drawings—only this time Deci told Group A that they'd be paid $1 (the equivalent of nearly $6 today) for every configuration they successfully reproduced. Group B, meanwhile, got new drawings but no pay. Finally, in the third session, both groups received new drawings and had to reproduce them for no compensation, just as in session one. (See the table below.)

HOW THE TWO GROUPS WERE TREATED

	Day 1	Day 2	Day 3
Group A	*No reward*	*Reward*	*No reward*
Group B	*No reward*	*No reward*	*No reward*

The twist came midway through each session. After a participant had assembled the Soma puzzle pieces to match two of the three drawings, Deci halted the proceedings. He said that he was going to give them a fourth drawing—but to choose the right one, he needed to feed their completion times into a computer. And—this being the late 1960s, when room-straddling mainframes were the norm and desktop PCs were still a decade away—that meant he had to leave for a little while.

On the way out, he said, "I shall be gone only a few minutes, you

may do whatever you like while I'm gone." But Deci wasn't really plugging numbers into an ancient teletype. Instead, he walked to an adjoining room connected to the experiment room by a one-way window. Then, for exactly eight minutes, he watched what people did when left alone. Did they continue fiddling with the puzzle, perhaps attempting to reproduce the third drawing? Or did they do something else—page through the magazines, check out the centerfold, stare into space, catch a quick nap?

In the first session, not surprisingly, there wasn't much difference between what the Group A and Group B participants did during that secretly watched eight-minute free-choice period. Both continued playing with the puzzle, on average, for between three and a half and four minutes, suggesting they found it at least somewhat interesting.

On the second day, during which Group A participants were paid for each successful configuration and Group B participants were not, the unpaid group behaved mostly as they had during the first free-choice period. But the paid group suddenly got *really* interested in Soma puzzles. On average, the people in Group A spent more than five minutes messing with the puzzle, perhaps getting a head start on that third challenge or gearing up for the chance to earn some beer money when Deci returned. This makes intuitive sense, right? It's consistent with what we believe about motivation: Reward me and I'll work harder.

Yet what happened on the third day confirmed Deci's own suspicions about the peculiar workings of motivation—and gently called into question a guiding premise of modern life. This time, Deci told the participants in Group A that there was only enough money to pay them for one day and that this third session would therefore be unpaid. Then things unfolded just as before—two puzzles, followed by Deci's interruption.

During the ensuing eight-minute free-choice period, the subjects in the never-been-paid Group B actually played with the puzzle for a little longer than they had in previous sessions. Maybe they were becoming ever more engaged; maybe it was just a statistical quirk. But the subjects in Group A, who previously had been paid, responded differently. They now spent significantly *less* time playing with the puzzle—not only about two minutes less than during their paid session, but about a full minute less than in the first session when they initially encountered, and obviously enjoyed, the puzzles.

In an echo of what Harlow discovered two decades earlier, Deci revealed that human motivation seemed to operate by laws that ran counter to what most scientists and citizens believed. From the office to the playing field, we knew what got people going. Rewards—especially cold, hard cash—intensified interest and enhanced performance. What Deci found, and then confirmed in two additional studies he conducted shortly thereafter, was almost the opposite. "When money is used as an external reward for some activity, the subjects lose intrinsic interest for the activity," he wrote.[5] Rewards can deliver a short-term boost—just as a jolt of caffeine can keep you cranking for a few more hours. But the effect wears off—and, worse, can reduce a person's longer-term motivation to continue the project.

Human beings, Deci said, have an "inherent tendency to seek out novelty and challenges, to extend and exercise their capacities, to explore, and to learn." But this third drive was more fragile than the other two; it needed the right environment to survive. "One who is interested in developing and enhancing intrinsic motivation in children, employees, students, etc., should not concentrate on external-control systems such as monetary rewards," he wrote in a

follow-up paper.[6] Thus began what for Deci became a lifelong quest to rethink why we do what we do—a pursuit that sometimes put him at odds with fellow psychologists, got him fired from a business school, and challenged the operating assumptions of organizations everywhere.

"It was controversial," Deci told me one spring morning forty years after the Soma experiments. "Nobody was expecting rewards would have a negative effect."

THIS IS A BOOK about motivation. I will show that much of what we believe about the subject just isn't so—and that the insights that Harlow and Deci began uncovering a few decades ago come much closer to the truth. The problem is that most businesses haven't caught up to this new understanding of what motivates us. Too many organizations—not just companies, but governments and nonprofits as well—still operate from assumptions about human potential and individual performance that are outdated, unexamined, and rooted more in folklore than in science. They continue to pursue practices such as short-term incentive plans and pay-for-performance schemes in the face of mounting evidence that such measures usually don't work and often do harm. Worse, these practices have infiltrated our schools, where we ply our future workforce with iPods, cash, and pizza coupons to "incentivize" them to learn. Something has gone wrong.

The good news is that the solution stands before us—in the work of a band of behavioral scientists who have carried on the pioneering efforts of Harlow and Deci and whose quiet work over the last half-century offers us a more dynamic view of human motivation. For too long, there's been a mismatch between what science

knows and what business does. The goal of this book is to repair that breach.

Drive has three parts. Part One will look at the flaws in our reward-and-punishment system and propose a new way to think about motivation. Chapter 1 will examine how the prevailing view of motivation is becoming incompatible with many aspects of contemporary business and life. Chapter 2 will reveal the seven reasons why carrot-and-stick extrinsic motivators often produce the opposite of what they set out to achieve. (Following that is a short addendum, Chapter 2a, that shows the special circumstances when carrots and sticks actually can be effective.) Chapter 3 will introduce what I call "Type I" behavior, a way of thinking and an approach to business grounded in the real science of human motivation and powered by our third drive—our innate need to direct our own lives, to learn and create new things, and to do better by ourselves and our world.

Part Two will examine the three elements of Type I behavior and show how individuals and organizations are using them to improve performance and deepen satisfaction. Chapter 4 will explore autonomy, our desire to be self-directed. Chapter 5 will look at mastery, our urge to get better and better at what we do. Chapter 6 will explore purpose, our yearning to be part of something larger than ourselves.

Part Three, the Type I Toolkit, is a comprehensive set of resources to help you create settings in which Type I behavior can flourish. Here you'll find everything from dozens of exercises to awaken motivation in yourself and others, to discussion questions for your book club, to a supershort summary of *Drive* that will help you fake your way through a cocktail party. And while this book is mostly about business, in this section I'll offer some thoughts about

how to apply these concepts to education and to our lives outside of work.

But before we get down to all that, let's begin with a thought experiment, one that requires going back in time—to the days when John Major was Britain's prime minister, Barack Obama was a skinny young law professor, Internet connections were dial-up, and a blackberry was still just a fruit.