"Mind-blowing."—*USA Today*

New York Times Bestseller

MICHAEL LEWIS

THE UNDOING PROJECT

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The UNDOING PROJECT

Introduction

THE PROBLEM THAT NEVER GOES AWAY

Back in 2003 I published a book, called *Moneyball*, about the Oakland Athletics' quest to find new and better ways to value baseball players and evaluate baseball strategies. The team had less money to spend on players than other teams, and so its management, out of necessity, set about rethinking the game. In both new and old baseball data—and in the work of people outside the game who had analyzed that data—the Oakland front office discovered what amounted to new baseball knowledge. That knowledge allowed them to run circles around the managements of other baseball teams. They found value in players who had been discarded or overlooked, and folly in much of what passed for baseball wisdom. When the book appeared, some baseball experts—entrenched management, talent scouts, journalists—were upset and dismissive, but a lot of readers found the story as interesting as I had. A lot of people saw in Oakland's approach to building a baseball team a more general lesson: If the highly paid, publicly scrutinized employees of a business that had existed since the 1860s could be misunderstood by their market, who couldn't be? If the market for baseball players was inefficient, what market couldn't be? If a fresh analytical approach had led to the discovery of new

knowledge in baseball, was there any sphere of human activity in which it might not do the same?

In the past decade or so, a lot of people have taken the Oakland A's as their role model and set out to use better data, and better analysis of that data, to find market inefficiencies. I've read articles about Moneyball for Education, Moneyball for Movie Studios, Moneyball for Medicare, Moneyball for Golf, Moneyball for Farming, Moneyball for Book Publishing(!), Moneyball for Presidential Campaigns, Moneyball for Government, Moneyball for Bankers, and so on. "All of a sudden we're 'Moneyballing' offensive linemen?" an offensive line coach for the New York Jets complained in 2012. After seeing the diabolically clever data-based approach taken by the North Carolina legislature in writing laws to make it more difficult for African Americans to vote, the comedian John Oliver congratulated the legislators for having "Money-balled racism."

But the enthusiasm for replacing old-school expertise with new-school data analysis was often shallow. When the data-driven approach to high-stakes decision making did not lead to immediate success—and, occasionally, even when it did—it was open to attack in a way that the old approach to decision making was not. In 2004, after aping Oakland's approach to baseball decision making, the Boston Red Sox won their first World Series in nearly a century. Using the same methods, they won it again in 2007 and 2013. But in 2016, after three disappointing seasons, they announced that they were moving away from the data-based approach and back to one where they relied upon the judgment of baseball experts. ("We have perhaps overly relied on numbers . . . ," said owner John Henry.) The writer Nate Silver for several years enjoyed breathtaking success predicting election outcomes for the *New York Times*, using an approach to statistics he learned writing about baseball. For the first time in memory, a newspaper seemed to have an edge in calling elections. But then Silver left the *Times*, and failed to predict the rise of Donald Trump—and his data-driven approach to predicting elections was called into question . . . by the *New York Times*! "Nothing exceeds the value of shoe-leather reporting, given that politics is an essentially human endeavor and

therefore can defy prediction and reason," wrote a *Times* columnist, late in the spring of 2016. (Never mind that few shoe-leather reporters saw Trump coming, either, or that Silver later admitted that, because Trump seemed sui generis, he'd allowed an unusual amount of subjectivity to creep into his forecasts.)

I'm sure some of the criticism of people who claim to be using data to find knowledge, and to exploit inefficiencies in their industries, has some truth to it. But whatever it is in the human psyche that the Oakland A's exploited for profit—this hunger for an expert who knows things with certainty, even when certainty is not possible—has a talent for hanging around. It's like a movie monster that's meant to have been killed but is somehow always alive for the final act.

And so, once the dust had settled on the responses to my book, one of them remained more alive and relevant than the others: a review by a pair of academics, then both at the University of Chicago—an economist named Richard Thaler and a law professor named Cass Sunstein. Thaler and Sunstein's piece, which appeared on August 31, 2003, in the *New Republic*, managed to be at once both generous and damning. The reviewers agreed that it was interesting that any market for professional athletes might be so screwed-up that a poor team like the Oakland A's could beat most rich teams simply by exploiting the inefficiencies. But—they went on to say—the author of *Moneyball* did not seem to realize the deeper reason for the inefficiencies in the market for baseball players: They sprang directly from the inner workings of the human mind. The ways in which some baseball expert might misjudge baseball players—the ways in which any expert's judgments might be warped by the expert's own mind—had been described, years ago, by a pair of Israeli psychologists, Daniel Kahneman and Amos Tversky. My book wasn't original. It was simply an illustration of ideas that had been floating around for decades and had yet to be fully appreciated by, among others, me.

That was an understatement. Until that moment I don't believe I'd ever heard of either Kahneman or Tversky, even though one of them had somehow managed to win a Nobel Prize in economics. And I hadn't actually thought much about the psychological aspects of the

Moneyball story. The market for baseball players was rife with inefficiencies: why? The Oakland front office had talked about "biases" in the marketplace: Foot speed was overrated because it was so easy to see, for instance, and a hitter's ability to draw walks was undervalued in part because walks were so forgettable—they seemed to require the hitter mainly to do nothing at all. Fat or misshapen players were more likely to be undervalued; handsome, fit players were more likely to be overvalued. All of these biases that the Oakland front office talked about I'd found interesting, but I hadn't really pushed further and asked: Where do the biases come from? Why do people have them? I'd set out to tell a story about the way markets worked, or failed to work, especially when they were valuing people. But buried somewhere inside it was another story, one that I'd left unexplored and untold, about the way the human mind worked, or failed to work, when it was forming judgments and making decisions. When faced with uncertainty—about investments or people or anything else—how did it arrive at its conclusions? How did it process evidence—from a baseball game, an earnings report, a trial, a medical examination, or a speed date? What were people's minds doing—even the minds of supposed experts—that led them to the misjudgments that could be exploited for profit by others, who ignored the experts and relied on data?

And how did a pair of Israeli psychologists come to have so much to say about these matters that they more or less anticipated a book about American baseball written decades in the future? What possessed two guys in the Middle East to sit down and figure out what the mind was doing when it tried to judge a baseball player, or an investment, or a presidential candidate? And how on earth does a psychologist win a Nobel Prize in economics? In the answers to those questions, it emerged, there was another story to tell. Here it is.

1

MAN BOOBS

You never knew what a kid in the interview room might say to jolt you out of your slumber and back to your senses and force you to pay attention. And once you were paying attention, you naturally placed far greater weight on whatever he had just said than you probably should: The most memorable moments in job interviews for the National Basketball Association were hard to consign to some appropriately sized compartment in the brain. In certain cases it was as if the players were trying to screw up your ability to judge them. For instance, when the Houston Rockets interviewer asked one player if he could pass a drug test, the guy had gone wide-eyed and grabbed the table and said, "You mean today!!!???" There was the college player who'd been arrested on charges (subsequently dropped) of domestic violence, and whose agent claimed it had been a simple misunderstanding. When they'd asked the player about it he'd explained, chillingly, that he'd grown weary of his girlfriend's "bitching, so I just put my hands around her neck and I squeezed. 'Cause I needed her to shut up." There was Kenneth Faried, the power forward out of Morehead State. When he showed up for his interview they'd asked him, "Do you prefer to be called Kenneth or Kenny?"

"Manimal," Faried said. He wanted to be called Manimal. What did you do with that? Roughly three out of every four of the black American players who came for NBA interviews—or at least came for interviews with the NBA's Houston Rockets—had never really known their father. "It's not uncommon, when you ask these guys who their biggest male influence was, for them to say, 'My mom,'" said the Rockets' director of player personnel, Jimmy Paulis. "One said, 'Obama.'"

Then there was Sean Williams. Back in 2007 Sean Williams, six foot ten, was an off-the-charts player who had been suspended from his Boston College team the first two of his three seasons after being arrested for possession of marijuana (a charge that was later dropped). He'd played only fifteen games his sophomore year and still blocked 75 shots; the fans referred to his college games as The Sean Williams Block Party. Sean Williams looked like a big-time NBA player and was expected to be a first-round pick—in part because everyone assumed that his ability to get through his junior year without being suspended meant that he'd gotten his marijuana use under control. Before the 2007 NBA draft, he'd flown to Houston, at his agent's request, to practice his interviewing skills. The agent cut the Rockets a deal: Williams would talk to the Rockets and the Rockets alone, and the Rockets would offer the agent tips about how to make Sean Williams more persuasive in a job interview. It actually went pretty well, until they got onto the topic of marijuana. "So you got caught smoking weed your freshman and sophomore years," said the Rockets interviewer. "What happened your junior year?" Williams just shook his head and said, "They stopped testing me. And if you're not going to test me, I'm gonna smoke!"

After that, Williams's agent decided it was best for Sean Williams not to grant any more interviews. He still got himself drafted in the first round by the New Jersey Nets, and made brief appearances in 137 NBA games before leaving to play in Turkey.

Millions of dollars were at stake—NBA players were, on average, by far the highest-paid athletes in all of team sports. The future success of the Houston Rockets was on the line. These young people were hurling information about themselves at you that was meant to help

you to make an employment decision. But a lot of times it was hard to know what to do with it.

Rockets interviewer: What do you know about the Houston Rockets?
Player: I know you are in Houston.

Rockets interviewer: Which foot did you hurt?
Player: I have been telling people my right foot.

Player: Coach and I did not see eye to eye.
Rockets interviewer: On what?
Player: Playing time.
Rockets interviewer: What else?
Player: He was shorter.

Ten years of grilling extremely tall people had reinforced in Daryl Morey, the general manager of the Houston Rockets, the sense that he should resist the power of any face-to-face interaction with some other person to influence his judgment. Job interviews were magic shows. He needed to fight whatever he felt during them—especially if he and everyone else in the room felt charmed. Extremely tall people had an unusual capacity to charm. "There's a lot of charming bigs," said Morey. "I don't know if it's like the fat kid on the playground or what." The trouble wasn't the charm but what the charm might mask: addictions, personality disorders, injuries, a deep disinterest in hard work. The bigs could bring you to tears with their story about their love of the game and the hardship they had overcome to play it. "They *all* have a story," said Morey. "I could tell you a story about every guy." And when the story was about perseverance in the face of incredible adversity, as it often was, it was hard not to grow attached to it. It was hard not to use it to create in your mind a clear picture of future NBA success.

But Daryl Morey believed—if he believed in anything—in taking a statistically based approach to decision making. And the most important decision he made was whom to allow onto his basketball team. "Your mind needs to be in a constant state of defense against all

this crap that is trying to mislead you," he said. "We're always trying to figure out what's a trick and what's real. Are we seeing a hologram? Is this an illusion?" These interviews belonged on the list of the crap trying to mislead you. "Here's the biggest reason I want to be in every interview," said Morey. "If we pick him, and he has some horrible problem and the owner asks, 'What did he say in the interview when you asked him that question?' and I go, 'I never actually spoke to him before we gave him one point five million dollars,' I get fired."

And so, in the winter of 2015, Morey, along with five members of his staff, sat in a conference room in Houston, Texas, waiting for another giant. The interview room contained nothing worth seeing. A conference table, some chairs, windows obscured by blinds. On the table rested a lone coffee mug, left by mistake, with a logo—National Sarcasm Society: Like We Need Your Support. The giant was . . . well, none of the men knew all that much about him except that he was still only nineteen years old, and that he was huge even by the standards of professional basketball. He'd been discovered five years earlier in a village in Punjab by some agent or talent scout—or so they'd been told. He was then fourteen years old, seven feet tall, and barefoot—or, at any rate, wearing shoes so tattered they revealed his feet.

They'd wondered about that. The kid's family must have been so poor that they couldn't afford to buy him shoes. Or maybe they'd decided it was pointless to buy shoes for feet that grew so rapidly. Or maybe the whole thing was a fiction invented by an agent. Either way, what lingered in the mind was the image: a seven-foot-tall, fourteen-year-old-boy, barefoot in the streets of India. They didn't know how the boy had found his way out of the Indian village. Somebody, probably an agent, had arranged for him to travel to the United States to learn how to speak English and play basketball.

To the NBA he was a complete unknown. There was no video of the guy playing organized basketball. He hadn't played, so far as the Rockets could determine. He hadn't participated in the NBA Draft Combine, the formal audition for amateur players. It was only just that morning that the Rockets had been permitted to take his measurements. His feet were size 22, and his hands, from fingertip to

wrist, were eleven and a half inches, the biggest hands the staff had ever measured. Shoeless, he stood seven foot two and weighed three hundred pounds, and his agent claimed he was still growing. He'd spent the past five years in southwest Florida learning basketball—most recently at IMG, a sports academy built to turn amateurs into professionals. Although no one they knew had seen him play, the few people who had laid eyes on him were still talking about it. Robert Upshaw, for instance. Upshaw was a thick seven-foot center who had been dismissed from his team at the University of Washington and was now auditioning for NBA teams. A few days earlier, in the Dallas Mavericks gym, he'd worked out with the Indian giant. Hearing from the Rockets scouts that he might be about to do it again, Upshaw's eyes went wide and his face lit up and he said, "The dude is the biggest human being I've ever seen. And he can shoot the three-ball! It's crazy."

Back in 2006, when he was hired to run the Houston Rockets and figure out who should play pro basketball and who should not, Daryl Morey had been the first of his kind: the basketball nerd king. His job was to replace one form of decision making, which relied upon the intuition of basketball experts, with another, which relied mainly on the analysis of data. He had no serious basketball-playing experience and no interest in passing himself off as a jock or a basketball insider. He'd always been just the way he was, a person who was happier counting than feeling his way through life. As a kid he'd cultivated an interest in using data to make predictions until it became a ruling obsession. "That always seemed the coolest thing to me," he said. "How do you use numbers to predict things? It was like a cool way to use numbers to be better than other people. And I really liked being better than other people." He built forecasting models the way other kids built model airplanes. "It was always sports I was trying to

predict. I didn't know what else to apply it to—what, am I going to forecast my grades?"

His interest in sports and statistics had led him, at the age of sixteen, to pick up a book called *The Bill James Historical Baseball Abstract*. Bill James was then busy popularizing an approach, rooted in statistical reasoning, to thinking about baseball. With some help from the Oakland Athletics, that approach would trigger a revolution that ended with nerds running, or helping to run, virtually every team in Major League Baseball. In 1988, when he stumbled upon James's book in a Barnes & Noble, Morey had no way of knowing that people with a gift for using numbers to predict things would overrun professional sports management and everyplace else high-stakes decisions were being made—or that basketball would be, in effect, waiting for him to grow up. He simply suspected that the established experts maybe didn't know as much as everyone thought they did.

That particular suspicion had been born the year before, 1987, after *Sports Illustrated* splashed his favorite baseball team, the Cleveland Indians, on its cover and picked them to win the World Series. "I was like, 'This Is It!!!! The Indians have sucked for years. Now we're going to win the World Series!'" The Indians finished that season with the worst record in the major leagues: How did that happen? "The guys they had said were going to be so good were so bad," recalled Morey. "And *that* was the moment when I thought: Maybe the experts don't know what they're talking about."

Then he discovered Bill James and decided that, like Bill James, he might use numbers to make better predictions than the experts. If he could predict the future performance of professional athletes, he could build winning sports teams, and if he could build winning sports teams . . . well, that's where Daryl Morey's mind came to rest. All he wanted to do in life was to build winning sports teams. The question was: Who'd let him do it? In college he'd sent dozens of letters to professional sports franchises in the hope of being offered some menial job. He received not a single reply. "I didn't have, like, any way to penetrate organized sports," he said. "So I decided at that point that I had to be rich. If I was rich I could just buy a team and run it."

His parents were middle-class midwesterners. He didn't even know any rich people. He was also a distinctly unmotivated student at Northwestern University. He nevertheless set out to make enough money to buy a professional sports team, so that he might make the decisions about who would be on it. "Every week he'd take a sheet of paper and write on top, 'My Goals,'" recalls his then-girlfriend, Ellen, now his wife. "The biggest life goal was, 'I'm going to someday own a professional sports team.'" "I went to business school," said Morey, "because I thought that's where you had to go if you wanted to get rich." Upon leaving business school, in 2000, he interviewed with consulting firms until he found one that got paid in the shares of the companies it advised. The firm was advising Internet companies during the Internet bubble: That sounded, at the time, like a way to get rich quick. Then the bubble burst and all the shares were worthless. "It turns out it was the worst decision ever," said Morey.

From his stint as a consultant he learned something valuable, however. It seemed to him that a big part of a consultant's job was to feign total certainty about uncertain things. In a job interview with McKinsey, they told him that he was not certain enough in his opinions. "And I said it was because I wasn't certain. And they said, 'We're billing clients five hundred grand a year, so you have to be sure of what you are saying.'" The consulting firm that eventually hired him was forever asking him to exhibit confidence when, in his view, confidence was a sign of fraudulence. They'd asked him to forecast the price of oil for clients, for instance. "And then we would go to our clients and tell them we could predict the price of oil. No one can predict the price of oil. It was basically nonsense."

A lot of what people did and said when they "predicted" things, Morey now realized, was phony: pretending to know things rather than actually knowing things. There were a great many interesting questions in the world to which the only honest answer was, "It's impossible to know for sure." "What will the price of oil be in ten years?" was such a question. That didn't mean you gave up trying to find an answer; you just couched that answer in probabilistic terms.

Later, when basketball scouts came to him looking for jobs, the trait

he looked for was some awareness that they were seeking answers to questions with no certain answers—that they were inherently fallible. "I always ask them, 'Who did you miss?'" he said. Which future superstar had they written off, or which future bust had they fallen in love with? "If they don't give me a good one, I'm like, 'Fuck 'em.'"

By a stroke of luck, the consulting firm Morey worked for was asked to perform some analysis for a group trying to buy the Boston Red Sox. When that group failed in its bid to buy a professional baseball team, it went out and bought a professional basketball team, the Boston Celtics. In 2001 they asked Morey to quit his job consulting and come to work for the Celtics, where "they gave me the most difficult problems to figure out." He helped hire new management, then helped to figure out how to price tickets, and, finally, inevitably, was asked to work on the problem of whom to select in the NBA draft. "How will that nineteen-year-old perform in the NBA?" was like "Where will the price of oil be in ten years?" A perfect answer didn't exist, but statistics could get you to some answer that was at least a bit better than simply guessing.

Morey already had a crude statistical model to evaluate amateur players. He'd built it on his own, just for fun. In 2003 the Celtics had encouraged him to use it to pick a player at the tail end of the draft—the 56th pick, when the players seldom amount to anything. And thus Brandon Hunter, an obscure power forward out of Ohio University, became the first player picked by an equation.* Two years later Morey got a call from a headhunter who said that the Houston Rockets were looking for a new general manager. "She said they were looking for a Moneyball type," recalled Morey.

The Rockets' owner, Leslie Alexander, had grown frustrated with the gut instincts of his basketball experts. "The decision making wasn't that good," Alexander said. "It wasn't precise. We now have all this data. And we have computers that can analyze that data. And I wanted to use that data in a progressive way. When I hired Daryl, it was because I wanted somebody that was doing more than just looking at players in the normal way. I mean, I'm not even sure we're playing the game the right way." The more the players got paid, the more costly to

him the sloppy decisions. He thought that Morey's analytical approach might give him an edge in the market for high-priced talent, and he was sufficiently indifferent to public opinion to give it a whirl. ("Who cares what other people think?" says Alexander. "It's not their team.") In his own job interview, Morey was reassured by Alexander's social fearlessness, and the spirit in which he operated. "He asked me, 'What religion are you?' I remember thinking, *I don't think you're supposed to ask me that*. I answered it vaguely, and I think I was saying my family were Episcopalians and Lutherans when he stops me and says, 'Just tell me you don't believe any of that shit.'"

Alexander's indifference to public opinion turned out to come in handy. Learning that a thirty-three-year-old geek had been hired to run the Houston Rockets, fans and basketball insiders were at best bemused and at worst hostile. The local Houston radio guys instantly gave him a nickname: Deep Blue. "There's an intense feeling among basketball people that I don't belong," said Morey. "They remain silent during periods of success and pop up when they sense weakness." In his decade in charge, the Rockets have had the third-best record of the thirty teams in the NBA, behind the San Antonio Spurs and the Dallas Mavericks, and have appeared in the playoffs more than all but four teams. They've never had a losing season. The people most upset by Morey's presence had no choice at times but to go after him in moments of strength. In the spring of 2015, as the Rockets, with the second-best record in the NBA, headed into the Western Conference Finals against the Golden State Warriors, the former NBA All-Star and current TV analyst Charles Barkley went off on a four-minute tirade about Morey during what was meant to be a halftime analysis of a game. ". . . I'm not worried about Daryl Morey. He's one of those idiots who believe in analytics. . . . I've always believed analytics was crap. . . . Listen, I wouldn't know Daryl Morey if he walked in this room right now. . . . The NBA is about talent. All these guys who run these organizations who talk about analytics, they have one thing in common: They're a bunch of guys who ain't never played the game, and they never got the girls in high school and they just want to get in the game."

There'd been a lot more stuff just like that. People who didn't know Daryl Morey assumed that because he had set out to intellectualize basketball he must also be a know-it-all. In his approach to the world he was exactly the opposite. He had a diffidence about him—an understanding of how hard it is to know anything for sure. The closest he came to certainty was in his approach to making decisions. He never simply went with his first thought. He suggested a new definition of the nerd: a person who knows his own mind well enough to mistrust it.

One of the first things Morey did after he arrived in Houston—and, to him, the most important—was to install his statistical model for predicting the future performance of basketball players. The model was also a tool for the acquisition of basketball knowledge. "Knowledge is literally prediction," said Morey. "Knowledge is anything that increases your ability to predict the outcome. Literally everything you do you're trying to predict the right thing. Most people just do it subconsciously." A model allowed you to explore the attributes in an amateur basketball player that led to professional success, and determine how much weight should be given to each. Once you had a database of thousands of former players, you could search for more general correlations between their performance in college and their professional careers. Obviously their performance statistics told you something about them. But which ones? You might believe—many then did—that the most important thing a basketball player did was to score points. That opinion could now be tested: Did an ability to score points in college predict NBA success? No, was the short answer. From early versions of his model, Morey knew that the traditional counting statistics—points, rebounds, and assists per game—could be wildly misleading. It was possible for a player to score a lot of points and hurt his team, just as it was possible for a player to score very little and be a huge asset. "Just having the model, without any human opinion at all, forces you to ask the right questions," said Morey. "Why is someone ranked so high by scouts when the model has him ranked low? Why is someone ranked so low by scouts when the model has him ranked high?"

He didn't think of his model as "the right answer" so much as "a better answer." Nor was he so naive as to think that the model would pick players all by itself. The model obviously needed to be checked and watched—mainly because there was information that the model wouldn't be privy to. If the player had broken his neck the night before the NBA draft, for instance, it would be nice to know. But if you had asked Daryl Morey in 2006 to choose between his model and a roomful of basketball scouts, he'd have taken his model.

That counted as original, in 2006. Morey could see that no one else was using a model to judge basketball players—no one had bothered to acquire the information needed by any model. To get any stats at all, he'd had to send people to the offices of the National Collegiate Athletic Association (NCAA), in Indianapolis, to photocopy box scores of every college game over the past twenty years, then enter all that data by hand into his system. Any theory about basketball players had to be tested on a database of players. They now had a twenty-year history of college players. The new database allowed you to compare players to similar players from the past, and see if there were any general lessons to be learned.

A lot of what the Houston Rockets did sounds simple and obvious now: In spirit, it is the same approach taken by algorithmic Wall Street traders, U.S. presidential campaign managers, and every company trying to use what you do on the Internet to predict what you might buy or look at. There was nothing simple or obvious about it in 2006. There was much information Morey's model needed that simply was not available. The Rockets began to gather their own original data by measuring things on a basketball court that had previously gone unmeasured. Instead of knowing the number of rebounds a player had, for instance, they began to count the number of genuine opportunities for rebounds he'd had and, of those, how many he had snagged. They tracked the scoring in the game when a given player was on the court, compared to when he was on the bench. Points and rebounds and steals *per game* were not very useful; but points and rebounds and steals *per minute* had value. Scoring 15 points a game obviously meant less if you had played the entire game than if you had played half of it.

It was also possible to back out from the box scores the pace at which various college teams played—how often they went up and down the court. Adjusting a college player's stats for his team's pace of play was telling. Points and rebounds meant one thing when the team took 150 shots a game and something different when it took just 75. Just adjusting for pace gave you a clearer picture of what any given player had accomplished than the conventional view did.

The Rockets collected data on basketball players that hadn't ever been collected before, and not just basketball data. They gathered information on the players' lives and looked for patterns in it. Did it help a player to have two parents in his life? Was it an advantage to be left-handed? Did players with strong college coaches tend to do better in the NBA? Did it help if a player had a former NBA player in his lineage? Did it matter if he had transferred from junior college? If his college coach played zone defense? If he had played multiple positions in college? Did it matter how much weight a player could bench-press? "Almost everything we looked at was nonpredictive," says Morey. But not everything. Rebounds per minute were useful in predicting the future success of big guys. Steals per minute told you something about the small ones. It didn't matter so much how tall a player was as how high he could reach with his hands—his length rather than his height.

The model's first road test came in 2007. (The Rockets had traded their picks in 2006.) Here was the chance to test a dispassionate, unsentimental, evidence-based approach against the felt experience of an entire industry. That year, the Rockets held the 26th and the 31st picks in the NBA draft. According to Morey's model, the odds of getting a good NBA player with those picks were, respectively, 8 percent and 5 percent. The chance of getting a starter was roughly one in a hundred. They selected Aaron Brooks and Carl Landry, both of whom became NBA starters. It was an incredibly rich haul.† "That lulled us to sleep," said Morey. He knew that his model was, at best, only slightly less flawed than the human beings who had rendered the judgments about job applicants since time began. He knew that he suffered from a serious dearth of good data. "You have some information—but often from a single year in college. And even that

has problems with it. Apart from it's a different game, with different coaches, different levels of competition—the players are twenty years old. *They* don't know who they are. So how are we supposed to?" He knew all this and yet he thought maybe they had figured something out. Then came 2008.

That year the Rockets ended up with the 33rd pick of the draft, a big guy from the University of Memphis named Joey Dorsey. In his job interview, Dorsey had been funny and likable and charming—he'd said when he was done playing basketball he intended to explore a second career as a porn star. After he was drafted, Dorsey was sent to Santa Cruz to play in an exhibition game against other newly drafted players. Morey went to go see him. "The first game I watch he looks terrible," said Morey. "And I'm like, 'Fuck!!!!'" Joey Dorsey was so bad that Daryl Morey could not believe he was watching the guy he'd drafted. Perhaps, Morey thought, he wasn't taking the exhibition seriously. "I meet with him. We have a two-hour lunch." Morey gave Dorsey a long talk about the importance of playing with intensity, and making a good impression, and so on. "I think he's going to come out the next game with his hair on fire. And he comes out and sucks the next game, too." Fairly quickly, Morey saw he had a bigger problem than Joey Dorsey. The problem was his model. "Joey Dorsey was a model superstar. The model said that he was like a can't-miss. His signal was super, super high."

That same year, the model had dismissed as unworthy of serious consideration a freshman center at Texas A&M named DeAndre Jordan. Never mind that every other team in the NBA, using more conventional scouting tools, passed him over at least once, or that Jordan wasn't taken until 35th pick of the draft, by the Los Angeles Clippers. As quickly as Joey Dorsey established himself as a bust, DeAndre Jordan established himself as a dominant NBA center and the second-best player in the entire draft class after Russell Westbrook.‡

This sort of thing happened every year to some NBA team, and usually to all of them. Every year there were great players the scouts missed, and every year highly regarded players went bust. Morey didn't think his model was perfect, but he also couldn't believe that it

could be so drastically wrong. Knowledge was prediction: If you couldn't predict such a glaringly obvious thing as the failure of Joey Dorsey or the success of DeAndre Jordan, how much did you know? His entire life had been shaped by this single, tantalizing idea: He could use numbers to make better predictions. The plausibility of that idea was now in question. "I'd missed something," said Morey. "What I missed were the limitations of the model."

His first mistake, he decided, was to have paid insufficient attention to Joey Dorsey's age. "He was insanely old," says Morey. "He was twenty-four years old when we drafted him." Dorsey's college career was impressive because he was so much older than the people he played against. He'd been, in effect, beating up on little kids. Raising the weight the model placed on a player's age flagged Dorsey as a weak NBA prospect; more tellingly, it improved the model's judgments about nearly all of the players in the database. For that matter, Morey realized, there existed an entire class of college basketball player who played far better against weak opponents than against strong ones. Basketball bullies. The model could account for that, too, by assigning greater weight to games played against strong opponents than against weak ones. That also improved the model.

Morey could see—or thought he could see—how the model had been fooled by Joey Dorsey. Its blindness to the value of DeAndre Jordan was far more troubling. The kid had played a single year of college basketball, not very effectively. It turned out that he had been a sensational high school player, had hated his college coach, and didn't even want to be in school. How could any model predict the future of a player who had intentionally failed? It was impossible to see Jordan's future in his college stats, and, at the time, there were no useful high school basketball statistics. So long as it relied almost exclusively on performance statistics, the model would *always* miss DeAndre Jordan. The only way to see him, it seemed, was with the eyes of an old-fashioned basketball expert. As it happens, Jordan had grown up in Houston under the eyes of Rockets scouts, and one of those scouts had wanted to draft him on the strength of what appeared to him undeniable physical talent. One of his scouts had seen what his model

had missed!

Morey—being Morey—had actually tested whether there were any patterns in the predictions made by his staff. He'd hired most of them and thought they were great, and yet there was no evidence any one of them was any better than the other, or the market, at predicting who would make it in the NBA and who would not. If there was any such thing as a basketball expert who could identify future NBA talent, he hadn't found him. He certainly didn't think that he was one. "Weighting my personal intuition more heavily did not cross my mind," he said. "I trust my gut very low. I just think there's a lot of evidence that gut instincts aren't very good."

In the end, he decided that the Rockets needed to reduce to data, and subject to analysis, a lot of stuff that had never before been seriously analyzed: physical traits. They needed to know not just how high a player jumped but how quickly he left the earth—how fast his muscles took him into the air. They needed to measure not just the speed of the player but the quickness of his first two steps. That is, they needed to be even more geeky than they already were. "When things go wrong, that's what people do," said Morey. "They go back to the habits that succeeded in the past. My thing was: Let's go back to first principles. If these physical tools are going to matter, let's test them more rigorously than they've ever been tested before. The weights we placed on production in college had to go down, and the weights we placed on raw physical abilities had to go up."

But once you started to talk about a guy's body and what it might or might not be able to do on an NBA court, there was a limit to the usefulness of even the objective, measurable information. You needed, or seemed to need, experts to look at the tools in action and judge how well they would function playing a different game, against better competition. You needed scouts to rate a player's ability to do the various things they knew were most important to do on a basketball court: shooting, finishing, getting to the rim, offensive rebounding, and so on. You needed *experts.* The limits of any model invited human judgment back into the decision-making process—whether it helped or not.

And thus began a process of Morey trying as hard as he'd ever tried at anything in his life to blend subjective human judgment with his model. The trick wasn't just to build a better model. It was to listen both to it and to the scouts at the same time. "You have to figure out what the model is good and bad at, and what humans are good and bad at," said Morey. Humans sometimes had access to information that the model did not, for instance. Models were bad at knowing that DeAndre Jordan sucked his freshman year in college because he wasn't trying. Humans were bad at . . . well, that was the subject Daryl Morey now needed to study more directly.

Freshly exposed to the human mind, Morey couldn't help but notice how strangely it operated. When it opened itself to information that might be useful in evaluating an amateur basketball player, it also opened itself to being fooled by the very illusions that had made the model such a valuable tool in the first place. For instance, in the 2007 draft there had been a player his model really liked: Marc Gasol. Gasol was twenty-two years old, a seven-foot-one center playing in Europe. The scouts had found a photograph of him shirtless. He was pudgy and baby-faced and had these jiggly pecs. The Rockets staff had given Marc Gasol a nickname: Man Boobs. Man Boobs this and Man Boobs that. "That was my first draft in charge and I wasn't so brave," said Morey. He allowed the general ridicule of Marc Gasol's body to drown out his model's optimism about Gasol's basketball future, and so instead of arguing with his staff, he watched the Los Angeles Lakers take Gasol with the 48th pick of the draft. The odds of getting an All-Star with the 48th pick in the draft were well below one in a hundred. The 48th pick of the draft basically never even yielded a useful NBA bench player, but already Marc Gasol was proving to be a giant exception.§ The label they'd stuck on him clearly had affected how they valued him: names mattered. "I made a new rule right then," said Morey. "I banned nicknames."

All of a sudden he was right back in the mess he and his model had been hired to eliminate. If he could never completely remove the human mind from his decision-making process, Daryl Morey had at least to be alive to its vulnerabilities. He now saw these everywhere he turned. One example: Before the draft, the Rockets would bring a player in with other players and put him through his paces on the court. How could you deny yourself the chance to watch him play? But while it was interesting for his talent evaluators to see a player in action, it was also, Morey began to realize, risky. A great shooter might have an off day; a great rebounder might get pushed around. If you were going to let everyone watch and judge, you also had to teach them not to place too much weight on what they were seeing. (Then why were they watching in the first place?) If a guy was a 90 percent free-throw shooter in college, for instance, it really didn't matter if he missed six free throws in a row during the private workout.

Morey leaned on his staff to pay attention to the workouts but not allow whatever they saw to replace what they knew to be true. Still, a lot of people found it very hard to ignore the evidence of their own eyes. A few found the effort almost painful, as if they were being strapped to the mast to listen to the Sirens' song. One day a scout came to Morey and said, "Daryl, I've done this long enough. I think we should stop having these workouts. Please, just stop doing them." Morey said, Just try to keep what you are seeing in perspective. Just weight it really low. "And he says, 'Daryl, I just can't do it.' It's like a guy addicted to crack," Morey said. "He can't even get near it without it hurting him."

Soon Morey noticed something else: A scout watching a player tended to form a near-instant impression, around which all other data tended to organize itself. "Confirmation bias," he'd heard this called. The human mind was just bad at seeing things it did not expect to see, and a bit too eager to see what it expected to see. "Confirmation bias is the most insidious because you don't even realize it is happening," he said. A scout would settle on an opinion about a player and then arrange the evidence to support that opinion. "The classic thing," said Morey, "and this happens *all* the time with guys: If you don't like a

prospect, you say he has no position. If you like him, you say he's multipositional. If you like a player, you compare his body to someone good. If you don't like him, you compare him to someone who sucks." Whatever prejudice a person brought to the business of selecting amateur players he tended to preserve, even when it served him badly, because he was always looking to have that prejudice confirmed. The problem was magnified by the tendency of talent evaluators—Morey included—to favor players who reminded them of their younger selves. "My playing career is *so* irrelevant to my career," he said. "And still I like guys who beat the shit out of people and cheat the rules and are nasty. Bill Laimbeer types. Because that's how I played." You saw someone who reminded you of you, and then you looked for the reasons why you liked him.

The mere fact that a player physically resembled some currently successful player could be misleading. A decade ago a six-foot-two-inch, light-skinned, mixed-race guy who had gone unnoticed by major colleges in high school and so played for some obscure tiny college, and whose main talent was long-range shooting, would have had no obvious appeal. The type didn't exist in the NBA—at least not as a raging success. Then Stephen Curry came along and set the NBA on fire, led the Golden State Warriors to an NBA championship, and was everyone's most valuable player. Suddenly—just like that—all these sharp-shooting mixed-race guards were turning up for NBA job interviews and claiming that their game was a lot like Stephen Curry's; and they were more likely to get drafted because of the resemblance.¶ "For five years after we drafted Aaron Brooks, we saw so many kids who compared themselves to Aaron. Because there are so many little guards." Morey's solution was to forbid all intraracial comparison. "We've said, 'If you want to compare this player to another player, you can only do it if they are a different race.'" If the player in question was African American, for instance, the talent evaluator was only allowed to argue that "he is like so-and-so" if so-and-so was white or Asian or Hispanic or Inuit or anything other than black. A funny thing happened when you forced people to cross racial lines in their minds: They ceased to see analogies. Their minds resisted the leap. "You just

don't see it," said Morey.

Maybe the mind's best trick of all was to lead its owner to a feeling of certainty about inherently uncertain things. Over and again in the draft you saw these crystal-clear pictures form in the minds of basketball experts which later proved a mirage. The picture in virtually every professional basketball scout's mind of Jeremy Lin, for instance. The now world-famous Chinese American shooting guard graduated from Harvard in 2010 and entered the NBA draft. "He lit up our model," said Morey. "Our model said take him with, like, the 15th pick in the draft." The objective measurement of Jeremy Lin didn't square with what the experts saw when they watched him play: a not terribly athletic Asian kid. Morey hadn't completely trusted his model—and so had chickened out and not drafted Lin. A year after the Houston Rockets failed to draft Jeremy Lin, they began to measure the speed of a player's first two steps: Jeremy Lin had the quickest first move of any player measured. He was explosive and was able to change direction far more quickly than most NBA players. "He's incredibly athletic," said Morey. "But the reality is that every fucking person, including me, thought he was unathletic. And I can't think of any reason for it other than he was Asian."

In some strange way people, at least when they were judging other people, saw what they expected to see and were slow to see what they hadn't seen before. How bad was the problem? When Jeremy Lin's coach at the New York Knicks finally put him in the game—because everyone else was injured—and allowed him to light up Madison Square Garden, the Knicks were preparing to release Jeremy Lin. Jeremy Lin had already decided that if he was released he'd simply quit basketball altogether. That's how bad the problem was: that a very good NBA player would never have been given a serious chance to play in the NBA, simply because the minds of experts had concluded he did not belong. How many other Jeremy Lins were out there?

After the Houston Rockets and everyone else in the NBA neglected to see Jeremy Lin's value in the draft (he signed after the draft as a free agent), the league shut down. A dispute between players and owners led to a lockout, and no one was allowed to work. Morey enrolled in an

executive education course at Harvard Business School and took a class in behavioral economics. He'd heard of the discipline ("I'm not an idiot") but had never studied it. At the start of the first class, the professor asked him and everyone else in the class to write down the last two digits of their cell phone on a sheet of paper. Then she asked the class to write down their best estimate of the number of African countries in the United Nations. Then she collected all the papers and showed them that the people whose cell phone numbers were higher offered systematically higher estimates of African countries in the United Nations. Then she took another example and said, "I'm going to do it again. I'm about to anchor you. Here. See if you aren't screwed up." Everyone had been warned; everyone's minds remained screwed up. Simply knowing about a bias wasn't sufficient to overcome it: The thought of that made Daryl Morey uneasy.

When the NBA returned to work he made yet another unsettling discovery. Just before the draft, the Toronto Raptors called and offered to trade their high first-round draft pick for Houston's backup point guard, Kyle Lowry. Morey talked about it with his staff, and they were on the brink of not doing the deal when one of the Rockets executives said, "You know, if we had the pick we're thinking of trading for and they offered Lowry for it, we wouldn't even consider it as a possibility." They stopped and analyzed the situation more closely: The expected value of the draft pick exceeded, by a large margin, the value they placed on the player they'd be giving up for it. The mere fact that they owned Kyle Lowry appeared to have distorted their judgment about him.** Looking back over the previous five years, they now saw that they'd systematically overvalued their own players whenever another team tried to trade for them. Especially when offered the chance to trade one of their NBA players for another team's draft picks, they'd refused deals they should have done. Why? They hadn't done it consciously.

Morey thus became aware of what behavioral economists had labeled "the endowment effect." To combat the endowment effect, he forced his scouts and his model to establish, going into the draft, the draft pick value of each of their own players.


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First published as a Norton paperback 2017

Book design by Chris Welch Design
Production manager: Julia Druskin
Digital production: Joe Lops
Cover design by Darren Haggar
Cover art: Kemie / Getty Images

The Library of Congress Cataloging-in-Publication Data

Names: Lewis, Michael (Michael M.)
Title: The undoing project : a friendship that changed our minds / Michael Lewis.
Description: First edition. | New York : W. W. Norton & Company, [2017] | Includes bibliographical references.
Identifiers: LCCN 2016046888 | ISBN 9780393254594 (hardcover)
Subjects: LCSH: Cognitive neuroscience. | Neurosciences. | Decision making. | Statistical decision.
Classification: LCC QP360.5 .L49 2017 | DDC 612.8/233—dc23 LC record available at https://lccn.loc.gov/2016046888

ISBN 978-0-393-25460-0 (e-book)
ISBN 978-0-393-35477-5 (pbk.)

W. W. Norton & Company, Inc.
500 Fifth Avenue, New York, N.Y. 10110
www.wwnorton.com

W. W. Norton & Company Ltd.
15 Carlisle Street, London W1D 3BS