

## Introduction

Everything that happens just happens because  
everything in the world just happened.

—*Uncle Herman*

**W**hen I was a child, my uncles would gather every Saturday at my grandparents' house to sit at a long dining room table telling jokes while accounting their week's gambling wins and losses. My grandfather Morris would retire to a musty back room, crank up his red-brown mahogany Victrola, lie diagonally across a double bed with his eyes closed and his feet off to one side, and listen to the distant voice of the velvety soprano Amelita Galli-Curci sing Gilda's arias from *Rigoletto*.

Gambling was the family pastime. During those moments when my grandfather was half asleep on the bed next door, my uncles were eager to hook me onto horse racing. My uncle Sam would give me a quarter and betting instructions.

"You gotta analyze," he said one day. "You gotta know the value of the odds. But the first and most important thing is to be sure that your horse has a good chance of coming in on your bet. If you don't like a horse 'cause of its name or 'cause you don't feel lucky that day, don't bet on it. And don't bet on a horse that's overly backed. Here, look at Victory Dancer, she's a three-to-one favorite, whaddaya think?"

"I don't like the name," I said.

"Good! Then it doesn't give you good luck. How about—"

I was a very impressionable young boy and took good luck to be some invisible thing enigmatically passed from one person to

another. There were times when I had it, days when I'd wake with it, moments when I could *feel* it; and then there were times when I sensed it disappointingly gone like the fudge at the bottom of a sundae. One day I won a minor door prize at Radio City Music Hall. What luck! I won a tub of Topps bubblegum and was called to the stage to pick it up—very exciting. That day I had it and felt it with an empowering energy that could have propelled me to the stars. But the next day my bicycle was stolen from a rack of twenty others and I spent the day whining, “Why me?” to myself.

Had it not been for my uncle Herman, I would have believed that the Roman goddess Fortuna turning her wheel impelled the rise and fall of my own luck. On days when I knew my number was on top, I would risk tossing my glass aggie shooter in a game of marbles or buy a few packs of bubblegum baseball cards and feverishly unwrap them, hoping to find a Phil Rizzuto or Mickey Mantle.

Herman walked into the room at the moment Sam was giving me gambling instructions. Somehow my uncle Herman escaped the gambling gene. He was monumentally built, tall, sturdy, and solid with an imposing power of speech and a voice that was both mellow and thunderous, like the roar of a lion that had swallowed a gallon of honey. Herman warned me of the family gambling addiction.

“Watch out for your uncles Sam and Al,” Herman said. “They’ll give you fifty cents and you’re hooked forever. They’ll give you advice on a horse that will win and from then on it’s in your blood.”

“What will be in my blood?” I asked, thinking he meant contamination leading to some foul disease.

“The nasty Hialeah delusion,” he said.

“What’s that?”

“It’s the message whispered in a gambler’s ear whenever he comes close to a racetrack.”

“What does it whisper?”

“You’ve got luck on your side,” he whispered as if it were some secret meant only for my ears. “Belief that you have luck on your side confuses you to think you have supernatural personal control of what happens to you. But you know there really isn’t any such thing as luck to have or not have. Everything that happens just happens because everything in the world just happened.”

“They only gave me a quarter,” I said, just to set the record straight.

Not completely understanding his little secret, I continued to believe that my own luck gave me absolute control, at least for those days when I had luck, and placed my quarter with Sam to bet on some horse called Brightstar to show. It showed all right. I had no reason for picking one thoroughbred from the next, but there was something in that name Brightstar and something in that day at the races that passed the torch of luck to me. Collecting fifty cents, I felt the heat of the torch and was hooked.

Herman was angry, because he knew that the thrill of that first win was the hook. Now Herman had a funny laugh that seemed to come from his nose—not a snort, but rather a nice laugh that was honest and charming. But when he was angry, his powerful voice would rise in volume and deepen in pitch to assure you that he was irked and that you’d better attempt to change his displeasure.

“Okay, okay,” said Sam after Herman boomed out his censure. “Your uncle is right. You were lucky this time. But you should remember that in the end the track wins.”

“You should remember more than that,” Herman thundered. “Look at your uncles who sit around this radio every Saturday afternoon after they’ve called their bookies. Do they look rich to you? If they know so much about horses and gambling, why aren’t they rich? Don’t gamble on a horse that you know nothing about. Even the best horse can slip in the mud and break a leg right in the middle of a race. Even the best horse can be unlucky some days.”

As soon as Herman left, gambling conversation would resume. And over my teenage years my uncles would give me lessons on luck and the mathematics of gambling odds.

“Suppose I make a \$2 bet on a number that has a hundred-to-one odds of coming up,” my uncle Carl once asked me. “And suppose the winning payoff is a hundred dollars. How many bets should I make to give me an even chance of winning?”

“Looks to me that you’d have to bet \$2 a hundred times to be sure to win,” I answered. “So it would cost you two hundred dollars to win one hundred dollars, not a good return.”

“No, no, no! That’s not what I’m asking. I’m asking how many bets must I make just to have an even chance.”

“Then you must make half a hundred different bets at \$2.”

“I’d be spending a hundred to make a hundred, no?” Carl said with a laugh.

“Sure,” I said. “But there’s no guarantee that you’ll win after betting on fifty different numbers. You might lose. The only guarantee is if you bet on every number.”

“Yes, yes, but I don’t want to do that because I’d be losing a hundred dollars. The whole point of gambling is to beat the odds, not match them.”

“Well, then, I suppose you just have to bet \$2 less than fifty times and take your chances.”

“Yes!” Carl said with a contorted smile. “That’s called gambling! Ya have to take your chances to beat the odds. Ya have to have luck to win.”

The idea for this book came to me late one cold snowy night when my car had broken down just outside a 7-Eleven. Waiting inside the convenience store for AAA to arrive, just before midnight, I watched person after person put down twenty, fifty, even a hundred dollars for Tri-State Megabucks. The pot was up to \$2.4 million. From what I could guess, those people were not exactly so well-off that they could blow a fifty on fleeting moments of entertainment—there were some who had me thinking about whether or not their children, if they had any, were getting enough to eat.

For years, I had been demonstrating to my family and students the futility of sweepstakes and lotteries. Then one day it happened. I won first prize, a \$20,000 bond, in a Pillsbury Company promotional sweepstakes; my wife had entered my name at a grand opening of a local supermarket. It was a 1.4 million-to-one chance. For one brief interval after that unlikely, fortunate event, I, too, fell under the spell of sweepstake optimism. In the weakness of euphoria, I filled out cards at every opportunity before realizing that my chances of a second win were just as miniscule as the first.

That night at the 7-Eleven awakened an old desire to write about the follies of ambitious belief in windfalls, of lottery optimism, and of gambling folly. A thunderous old pickup pulled up to the front

door and a very thin man stepped out of its rusting cab. He entered the store, slapped down five twenty-dollar bills on the counter along with his list of hopeful Megabucks numbers, and said just one word to the young girl behind the counter—"Payday." It was that man and his one word that drove my next thought, which was to write a didactic book on the pitfalls of misunderstanding luck. Later that night, driving home on icy roads, the heater on full blast, I toyed with the idea that the book should be sermonizing the consequences of addictive behavior.

But the book does not sermonize. In rational moments of research and the eventual composition, I found my writing compelled by the history with strong obligations to understand the nubs and cores of gambling, without giving any advice other than that that comes from understanding the mathematics of likelihood as well as an awareness of the risks of gambling optimism. My car breakdown may have been the instrument of the idea, but it would not have motivated me enough without my never-ending desire to comprehend something I had never really understood to my own satisfaction—the magnificent law of large numbers, that theorem describing the long-term stability of the average value of a random variable. It had always seemed too implausible, too fanciful. How could a large collection of independent random happenings possibly be mathematically predicted? How could crowds choose more wisely than small groups or individuals? How could casino managers know their profits in advance with such uncanny precision? How is it that bookies—so sure of the odds they offer—rarely gamble against the odds? And then, weirdest of all: how is it possible that mathematics can be so clever as to compose such a phenomenological law, a principle of chance? These are the driving questions of this book.

Gambling goes back to the beginning of time when cavemen rolled stones the way children in the last century tossed marbles. Homer tells us that gambling and luck have their roots in the beginning of time when Zeus, Poseidon, and Hades drew lots for shares in the universe. Poseidon's luck was to draw the gray sea to live in; Hades got the mists and the darkness; and Zeus the wide sky, the clouds, and light air.<sup>1</sup>

Throughout history, luck has been believed to be not only some desirable thing to be possessed in order to win at gambling but also some telekinetic spirit protecting the body against misfortune. Ancient religions attributed luck to deities of destiny—Min in Egypt, Tyche in Greece, Fortuna in Rome. Medieval tradition personified Fortune as a woman turning a wheel that would determine an individual's fate. An illumination in a fifteenth-century French translation of Boccaccio's *De Casibus Virorum Illustrium*, a collection of moral stories about the rise and fall of famous men, shows Boccaccio pointing to the goddess Fortune turning a wheel of people rising and falling. And Chaucer's Monk's Tale sees luck in Fortune's will:

For sure it is, if Fortune wills to flee,  
 No man may stay her course or keep his hold;  
 Let no one trust a blind prosperity.  
 Be warned by these examples, true and old.<sup>2</sup>

Such views carry the notion that whatever happens is beyond a person's control. Christianity and Islam designate God as the keeper of luck; his providence may influence a person's destiny. There was a time when these religions accepted omens and ritual sacrifice in attempts to gain favor and influence God's plans; we still use the term *by the grace of God* to mean that God has the power to change destiny and with a bit of luck a person's prayer might get him to do so.

Even today, gamblers are under the impression that there is such a thing called luck and that it can be felt and had with a rabbit's foot or crossed fingers, or lost by the path of a black cat. Maybe they are right, but with the popularity of gambling on the rise and with one in twenty gamblers falling into the pathological end of the spectrum, with reality gambling TV shows such as *Deal or No Deal* captivating huge numbers of viewers, and with Internet gambling and state lotteries sucking up the paychecks of some of the poorest Americans, it seems to be the right time to learn what luck really is, why we think we can possess it with empowering energy, and why we are so influenced by it.

And yet, belief in luck can be a good thing. Its placebo effect is responsible for a good many cures of ailments that would have

otherwise overpowered the ill. Not to undermine the helpful feelings of luck and their spiritual benefits, this book concentrates on the mathematics behind gambling to empower the reader who knew—all along—that the powerful illusion of luck is not some acquired supernatural essence but something that can be cogently explained by rules of probability. It alerts and coaches the educated person on the street that that mysterious thing, which agreeably whispers wishful thinking in ears at gambling casinos everywhere, is actually a diabolical con. Ultimately, we want to understand greed and luck in gambling, as well as why people accept bets with negative expectation, and finally answer the fundamental question from both mathematical and psychological positions: what makes us feel lucky in gambling?

There are, essentially, just eight mathematical terms referred to in this book.

1. Binomial frequency curve
2. Combinations
3. Expected value (sometimes called expectation)
4. Mean
5. Odds
6. Probability
7. Standard deviation
8. Standard normal curve

When you come across any of these terms unfamiliar to you, refer to appendix D. Definitions and examples are listed there.

You will notice balloon callouts with numbers in the margins. They  indicate that further explanations can be found in appendix E.