

‘Your view of human nature will change  
profoundly as you read this brilliant book.’

DANIEL KAHNEMAN,  
*Author of *Thinking, Fast and Slow**

THE

A single, large, white marshmallow is centered on the cover. It has a soft, slightly irregular shape with some texture visible on its surface. The marshmallow is positioned between the words 'THE' and 'TEST', and the word 'marshmallow' is written across its middle.

marshmallow

TEST

Understanding self-control and  
how to master it

WALTER MISCHEL

## ABOUT THE BOOK

**Renowned psychologist Walter Mischel, inventor of the famous Marshmallow Test, explains what self-control is and how to master it.**

A child is presented with a marshmallow and given a choice: Eat this one now, or wait and enjoy two later. What will she do? And what are the implications for her behaviour later in life?

Walter Mischel's now iconic Marshmallow Test, one of the most famous experiments in the history of psychology, proved that the ability to delay gratification is critical to living a successful and fulfilling life: self-control not only predicts higher marks in school, better social and cognitive functioning, and a greater sense of self-worth; it also helps us manage stress, pursue goals more effectively, and cope with painful emotions. But is willpower prewired, or can it be taught?

In his groundbreaking new book, Dr. Mischel draws on decades of compelling research and life examples to explore the nature of willpower, identifying the cognitive skills and mental mechanisms that enable it and showing how these can be applied to challenges in everyday life - from weight control to quitting smoking, overcoming heartbreak, making major decisions and planning for retirement. At the heart of the story are two closely interacting systems within the human brain, one 'hot' and reflexive, the other 'cool' and strategic. The ways in which these two systems interact in the face of strong temptations underlie how preschoolers deal with marshmallows and how our own willpower works, or doesn't.

With profound implications for the choices we make in parenting, education, public policy and self-care, *The Marshmallow Test* will change the way we think about who we are and what we can be. And since, as Mischel argues, a life with too much self-control can be as unfulfilling as one with too little, this book will also teach you when it's time to ring the bell and enjoy that marshmallow.

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THE  
marshmallow  
TEST

Understanding self-control  
and how to master it

WALTER MISCHEL

*For Judy, Rebecca, Linda*

# INTRODUCTION

AS BOTH MY STUDENTS and my children can testify, self-control does not come naturally to me. I have been known to call my students in the middle of the night to ask how the latest data analysis was going, though it began only that evening. At dinners with friends, to my embarrassment my plate is often the first to be clean, when others are far from done. My own impatience, and the discovery that self-control strategies can be learned, has kept me studying those strategies for a lifetime.

The basic idea that drove my work and motivated me to write this book was my belief, and the findings, that the ability to delay immediate gratification for the sake of future consequences is an acquirable cognitive skill. In studies initiated half a century ago, and still ongoing today, we've shown that this skill set is visible and measurable early in life and has profound long-term consequences for people's welfare and mental and physical health over the life span. Most important, and exciting for its educational and child-rearing implications, it is a skill open to modification, and it can be enhanced through specific cognitive strategies that have now been identified.

The Marshmallow Test and the experiments that have followed over the last fifty years have helped stimulate a remarkable wave of research on self-control, with a fivefold increase in the number of scientific publications just within the first decade of this century.<sup>1</sup> In this book I tell the story of this research, how it is illuminating the mechanisms that enable self-control, and how these mechanisms can be harnessed constructively in everyday life.



It began in the 1960s with preschoolers at Stanford University's Bing Nursery School, in a simple study that challenged them with a tough dilemma. My students and I gave the children a choice between one reward (for example, a marshmallow) that they could have immediately, and a larger reward (two marshmallows) for which they would have to wait, alone, for up to 20 minutes. We let the children select the rewards they wanted most from an assortment that included marshmallows, cookies, little pretzels, mints, and so on. "Amy," for example, chose marshmallows.<sup>2</sup> She sat alone at a table facing the one marshmallow that she could have immediately, as well as the two marshmallows that she could have if she waited. Next to the treats was a desk bell she could ring at any time to call back the researcher and eat the one marshmallow. Or she could wait for the researcher to return, and if Amy hadn't left her chair or started to eat the marshmallow, she could have both. The struggles we observed as these children tried to restrain themselves from ringing the bell could bring tears to your eyes, have you applauding their creativeness and cheering them on, and give you fresh hope for the potential of even young children to resist temptation and persevere for their delayed rewards.

What the preschoolers did as they tried to keep waiting, and how they did or didn't manage to delay gratification, unexpectedly turned out to predict much about their future lives. The more seconds they waited at age four or five, the higher their college-admission SAT scores and the better their rated social and cognitive functioning in adolescence.<sup>3</sup> At age 27-32, those who had waited longer during the Marshmallow Test in preschool had a lower body mass index and a better sense of self-worth, pursued their goals more effectively, and coped more adaptively with frustration and stress. At midlife, those who could

consistently wait (“high delay”), versus those who couldn’t (“low delay”), were characterized by distinctively different brain scans in areas linked to addictions and obesity.

What does the Marshmallow Test really show? Is the ability to delay gratification prewired? How can it be taught? What is its downside? This book speaks to these questions, and the answers are often surprising. In *The Marshmallow Test*, I discuss what “willpower” is and what it is not, the conditions that undo it, the cognitive skills and motivations that enable it, and the consequences of having it and using it. I examine the implications of these findings for rethinking who we are; what we can be; how our minds work; how we can — and can’t — control our impulses, emotions, and dispositions; how we can change; and how we can raise and educate our children.

Everybody is eager to know how willpower works, and everybody would like to have more of it, and with less effort, for themselves, their children, and their relatives puffing on cigarettes. The ability to delay gratification and resist temptations has been a fundamental challenge since the dawn of civilization. It is central to the Genesis story of Adam and Eve’s temptation in the Garden of Eden, and a subject of the ancient Greek philosophers, who named the weakness of the will *akrasia*. Over the millennia, willpower was considered an immutable trait — you either had it or you didn’t — making those low in willpower victims of their biological and social histories and the forces of the momentary situation. Self-control is crucial for the successful pursuit of long-term goals. It is equally essential for developing the self-restraint and empathy needed to build caring and mutually supportive relationships. It can help people avoid becoming entrapped early in life, dropping out of school, becoming impervious to consequences, or getting stuck in jobs they hate. It is the “master aptitude” underlying emotional intelligence,

essential for constructing a fulfilling life.<sup>4</sup> And yet, despite its evident importance, it was excluded from serious scientific study until my students and I demystified the concept, created a method to study it, showed its critical role for adaptive functioning, and parsed the psychological processes that enable it.

Public attention to the Marshmallow Test increased early in this century and keeps escalating. In 2006, David Brooks devoted an editorial to it in the Sunday *New York Times*, and years later in an interview he conducted with President Obama, the president asked Brooks if he wanted to talk about marshmallows.<sup>5, 6</sup> The test was featured in *The New Yorker* in a 2009 Department of Science article, and the research is widely presented in television programs, magazines, and newspapers throughout the world.<sup>7</sup> It is even guiding the efforts of *Sesame Street*'s Cookie Monster to master his impulse to voraciously devour cookies so that he may join the Cookie Connoisseurs Club. The marshmallow research is influencing the curriculum in many schools that teach a wide range of children, from those living in poverty to those attending elite private academies.<sup>8</sup> International investment companies use it to encourage retirement planning.<sup>9</sup> And a picture of a marshmallow has become an immediately understood opener to launch discussions of delay of gratification with almost any audience. In New York City, I see kids coming home from school wearing T-shirts that say *Don't Eat the Marshmallows* and large metal buttons declaring *I Passed the Marshmallow Test*. Fortunately, as the public interest in the topic of willpower increases, so does the amount and depth of scientific information on how delay of gratification and self-control are enabled, both psychologically and biologically.

In order to understand self-control and the ability to delay gratification, we need to grasp not only what enables

it but also what undoes it. As in the parable of Adam and Eve, we see headline after headline that reveals the latest celebrity — a president, a governor, another governor, a revered judge and moral pillar of society, an international financial and political wizard, a sports hero, a film star — who blew it with a young intern, a housekeeper, or an illegal drug. These people are smart, and not just in their IQ intelligence but emotional and social intelligence as well — otherwise they could not have achieved their eminence. Then why do they act so stupid? And why do they have so much company in the many men and women who never make it into the headlines?

I draw on findings at the vanguard of science to try to make sense of this. At the heart of the story are two closely interacting systems within the human brain, one “hot” — emotional, reflexive, unconscious — and the other “cool” — cognitive, reflective, slower, and effortful.<sup>10</sup> The ways in which these two systems interact in the face of strong temptations underlie how preschoolers deal with marshmallows and how willpower works, or doesn’t. What I learned changed my long-held assumptions about who we are, the nature and expressions of character, and the possibilities for self-generated change.

[Part I](#), *Delay Ability: Enabling Self-Control*, tells the story of the Marshmallow Test and the experiments that showed preschool children doing what Adam and Eve could not do in the Garden of Eden. The results identified the mental processes and strategies through which we can cool hot temptations, delay gratification, and achieve self-control. They also pointed to possible brain mechanisms that enable these achievements. Decades later, a flood of brain research is using cutting-edge imaging techniques to probe the mind-brain connections and help us understand what the preschooler managed to do.

The marshmallow findings inevitably lead to the question “Is self-control prewired?” Recent discoveries in the science of genetics are providing fresh answers to that question. They are revealing the surprising plasticity of our brains and transforming how we think about the role of nurture and DNA, environment and heredity, and the malleability of human nature. The implications go far beyond the science lab and contradict widely shared beliefs about who we are.

[Part I](#) leaves us with a mystery: why does the preschooler’s ability to wait for more treats, rather than ring the bell and settle for less, predict so much about future success and well-being? I answer that question in [Part II](#), From Marshmallows in Preschool to Money in Retirement, where I look at how self-control ability influences the journey from preschool to retirement planning, how it paves the way to creating successful experiences and positive expectations — an “I think I can!” mind-set and a sense of self-worth. While not guaranteeing success and a rosy future, self-control ability greatly improves the chances, helping us make the tough choices and sustain the effort needed to reach our goals. How well it works depends not just on skills but on internalizing goals and values that direct the journey, and on motivation that is strong enough to overcome the setbacks along the route. How self-control can be harnessed to build such a life by making willpower less effortful and increasingly automatic and rewarding is the story of [Part II](#), and like life itself it unfolds in unexpected ways. I discuss not just resistance to temptation but diverse other self-control challenges, from cooling painful emotions, overcoming heartbreak, and avoiding depression to making important decisions that take future consequences into account. And while [Part II](#) shows the benefits of self-control, it makes its limits equally clear: a life with too much of it can be as unfulfilling as one with too little.

In [Part III](#), From Lab to Life, I look at the implications of the research for public policy, focusing on how recent educational interventions beginning in preschool are incorporating lessons on self-control in order to give those children living under conditions of toxic stress a chance to build better lives. I then summarize the concepts and strategies examined throughout this book that can help with everyday self-control struggles. The final chapter considers how findings about self-control, genetics, and brain plasticity change the conception of human nature, and the understanding of who we are and what we can be.

In writing *The Marshmallow Test*, I imagined myself having a leisurely conversation with you, the reader, much like the many I have had with friends and new acquaintances, sparked by the question “What’s the latest in the marshmallow work?” Soon we veer off into how the findings relate to aspects of our own lives, from child rearing, hiring new staff, and avoiding unwise business and personal decisions to overcoming heartbreak, quitting smoking, controlling weight, reforming education, and understanding our own vulnerabilities and strengths. I have written the book for those of you who, like me, have struggled with self-control. I’ve also written it for those who simply would like to understand more deeply how our minds work. I hope *The Marshmallow Test* will start some new conversations for you.

## PART I

# DELAY ABILITY

### *Enabling Self-Control*

PART I BEGINS IN the 1960s in what my students and I called “the Surprise Room” at Stanford University’s Bing Nursery School, where we developed the method that became the Marshmallow Test. We started with experiments to observe when and how preschoolers became able to exert sufficient self-restraint to wait for two marshmallows they eagerly wanted rather than settle for just one right away. The longer we looked through the one-way observation window, the more we were astonished by what we saw as the children tried to control themselves and wait. Simple suggestions to think about the treats in different ways made it either impossibly difficult or remarkably easy for them to resist the temptation. Under some conditions they could keep on waiting; under others they rang the bell moments after the researcher left the room. We continued our studies to identify those conditions, to see what the children were thinking and doing that allowed them to control themselves, to try to figure out just how they made their struggles with self-control easier — or bound to fail.

It took many years, but gradually a model emerged of how the mind and brain work when preschoolers and adults struggle to resist temptations and manage to succeed. How self-control can be achieved — not by toughing it out or just saying “No!” but by changing how we think — is the story

of [Part I](#). Beginning early in life, some people are better than others at self-control, but almost everybody can find ways to make it easier. [Part I](#) shows how that can be done.

We also found that the roots of self-control are already visible in the toddler's behavior. So is self-control all prewired? [Part I](#) ends by answering that question in light of recent findings in genetics that profoundly change earlier views of the nature versus nurture puzzle. This new understanding has serious implications for how we raise and educate our children and how we think about them and ourselves, and I turn to this in subsequent chapters.



# 1

## IN STANFORD UNIVERSITY'S SURPRISE ROOM

AT THE FAMOUS PARIS medical school named in honor of René Descartes, students crowd the street in front of its impressive pillared entry, chain-smoking cigarettes whose packets announce in French in large capital letters SMOKING KILLS. The messes that result when people cannot inhibit immediate gratification for the sake of delayed outcomes, even when they know they should, are familiar. We see them in our children and in ourselves. We see willpower's failure whenever earnest New Year's resolutions — to quit smoking, to go to the gym regularly, to stop quarreling with the person you love most — dissolve before January ends. I once had the pleasure of participating with Thomas Schelling, a Nobel laureate in economics, in a seminar on self-control. He wrote this summary of the dilemmas created by a weakness of will:<sup>1</sup>

How should we conceptualize this rational consumer whom all of us know and who some of us are, who in self-disgust grinds his cigarettes down the disposal swearing that this time he means never again to risk orphaning his children with lung cancer and is on the street three hours later looking for a store that's still open to buy cigarettes; who eats a high-calorie lunch knowing that he will regret it, does regret it, cannot understand how he lost control, resolves to compensate with a low-calorie dinner, eats a high-calorie dinner knowing he will regret it, and does regret it; who sits glued to the TV knowing that again tomorrow he'll wake early in a cold sweat unprepared for that morning meeting on which so much of his career depends; who spoils the trip to Disneyland

by losing his temper when his children do what he knew they were going to do when he resolved not to lose his temper when they did it?

Debates about the nature and existence of willpower notwithstanding, people go right on exercising it, struggling to climb up Mount Everest, enduring years of self-denial and strict training to get to the Olympics or star in the ballet, even kicking well-established drug addictions. Some adhere to stringent diets or give up tobacco after years of lighting the next cigarette from the one still in the mouth; others fail in spite of beginning with the same good intentions. And when we look closely at ourselves, how do we explain when and why our willpower and self-control efforts work or don't?

Before coming to Stanford as a psychology professor in 1962, I had done research on decision making in Trinidad and at Harvard, asking children to choose between less candy now or more later, or less money now versus more later. (I discuss this research in [Chapter 6](#).) But our initial *choice* to delay and the ability to stick with it when faced with hot temptations easily go their separate ways. On entering a restaurant I can decide, indeed firmly resolve, "No dessert tonight! I won't do it because I have to avoid the cholesterol, the expanding waist, the next bad blood test ..." Then the pastry cart rolls by and the waiter flashes the chocolate mousse in front of my eyes, and before there's time to reflect it winds up in my mouth. Given how often that happened to me, I became curious about what it takes to stick with the virtuous resolutions I kept abandoning. The Marshmallow Test became the tool for studying how people go from a choice to delay gratification to actually managing to wait and resist the temptation.

## MAKING THE MARSHMALLOW TEST

From the age of antiquity, to the Enlightenment, to Freud, to the present day, young children have been characterized as impulsive, helpless, unable to delay gratification, and seeking only immediate satisfaction.<sup>2</sup> With those naive expectations, I was surprised as I watched each of my three closely spaced daughters, Judith, Rebecca, and Linda, change in their first few years of life. They quickly morphed from mostly gurgling or screaming, to learning in exquisite detail how to annoy one another and enchant their parents, to becoming people with whom one could have fascinating, thoughtful conversations. In just a few years they could even sit more or less still to wait for things they wanted, and I tried to make sense out of what was unfolding in front of me at the kitchen table. I realized that I didn't have a clue about what went on in their heads that enabled them to control themselves, at least some of the time, and to delay gratification in the face of temptations, even when no one was hovering over them.

I wanted to understand willpower, and specifically delay of gratification for the sake of future consequences — how people experience and exert it, or don't, in everyday life. To move beyond speculation, we needed a method to study this ability in children as they began to develop it. I could see the skill developing in my three daughters when they were preschoolers at the Bing Nursery School at Stanford. This preschool was the ideal laboratory, newly completed on the campus as an integrated early education and research facility, with large one-way glass observation windows onto the attractive play areas, and small attached research rooms in which behavior could also be unobtrusively observed from a monitoring booth. We used one of these rooms for our research and told the children this was "the Surprise Room." That's where we escorted them to play the "games" that became our experiments.

In the Surprise Room, my graduate students Ebbe Ebbesen, Bert Moore, and Antonette Zeiss and I, as well as many other students, spent months of fun and frustration crafting, pilot-testing, and fine-tuning the procedure. For example, would telling preschoolers how long the delay would be — say 5 minutes versus 15 minutes — influence how long they waited? We found that it did not matter since they were still too young to understand such time differences. Would the relative amount of the rewards matter? It did. But what kind of rewards? We needed to create an intense conflict between an emotionally hot temptation that the child was eager to have immediately and one that was twice as large but required him or her to delay gratification for at least a few minutes. The temptation had to be meaningful and powerful enough for young girls and boys; appropriate, yet easily and precisely measurable.

Fifty years ago most children probably loved marshmallows as much as they do now, but — at least at Stanford's Bing Nursery School — their parents sometimes forbade them unless a toothbrush was at hand. Absent a universal favorite, we offered a selection of treats from which the children could choose. Whatever they selected, we offered them a choice of getting one treat right away or two if they waited for the researcher to return "by herself." Our frustration working out the details peaked when a first grant application to support the research was turned down by a federal agency with the suggestion that we apply instead to a candy company. We feared they might be right.

My previous research in the Caribbean had shown the importance of trust as a factor in the willingness to delay gratification.<sup>3</sup> To assure that the children trusted the person who made the promise, they first played with the researcher until they were comfortable. Then the child was seated at a small table that had a desk bell on it. To further

increase trust, the researcher repeatedly stepped out of the room, the child rang the bell, and the researcher immediately jumped back in, exclaiming, “You see? You brought me back!” As soon as the child understood that the researcher would always return immediately when summoned, the self-control test, described as another “game,” began.

Though we kept the method simple, we gave it an impossibly cumbersome academic name: “The preschool self-imposed delay of immediate gratification for the sake of delayed but more valued rewards paradigm.” Fortunately, decades later, after the columnist David Brooks discovered the work and featured it in the *New York Times* under the title “Marshmallows and Public Policy,” the media dubbed it “the Marshmallow Test.” The name stuck, although we often did not use marshmallows as the treats.

When we designed the experiment in the 1960s we did not film the children. But twenty years later, to record the Marshmallow Test procedure and to illustrate the diverse strategies children use as they try to wait for their treats, my former postdoc Monica L. Rodriguez filmed five- to six-year-olds with a hidden camera in a public school in Chile. Monica followed the same procedure we had used in the original experiments. First up was “Inez,” an adorable little six-year-old with a serious expression but a twinkle in her eye. Monica seated Inez at a small table in the school’s barren research room. Inez had chosen Oreo cookies as her treats. On the table were a desk bell and a plastic tray the size of a dinner plate, with two cookies in one corner of the tray and one in the other corner. Both the immediate and the delayed rewards were left with the children, to increase their trust that the treats would materialize if they waited for them as well as to intensify their conflict. Nothing else was on the table, and no toys or interesting objects were available in the room to distract the children while they waited.

Inez was eager to get two cookies rather than just one when given the choice. She understood that Monica had to go out of the room to do some work but that she could call her back at any time by ringing the bell. Monica let Inez try ringing it a couple of times, to demonstrate that each time she rang Monica would immediately come back in the room. Monica then explained the contingency. If Inez waited for her to come back by herself, she got the two cookies. If she did not want to wait, she could ring the bell at any time. But if she rang the bell, or began to eat the treat, or left the chair, she'd get only the single cookie. To be sure that Inez understood the instructions fully, she was asked to repeat them.

When Monica exited, Inez suffered for an agonizing few moments with an increasingly sad face and visible discomfort until she seemed about to burst into tears. She then peeked down at the treats and stared hard at them for more than ten seconds, deep in thought. Suddenly her arm shot out toward the bell but just as her hand got to it, she stopped herself abruptly. Gingerly, tentatively, her index finger hovered above the bell's ringer, almost but not quite touching it, over and over, as if to tease herself. But then she jerked her head away from the tray and the bell, and burst out laughing, as if she had done something terribly funny, sticking her fist into her mouth to prevent herself from roaring aloud, her face beaming with a self-congratulatory smile. No audience has watched this video without oohing and laughing along with Inez in empathic delight. As soon as she stopped giggling, she repeated her teasing play with the bell, but now she alternately used her index finger to shush herself and stuck her hand in front of her carefully closed lips, whispering "No, no" as if to stop herself from doing what she had been about to do. After 20 minutes had passed, Monica returned "by herself," but instead of eating the treats right away, Inez marched off triumphantly with her two cookies in a bag because she

wanted to take them home to show her mother what she had managed to do.

“Enrico,” large for his age and dressed in a colorful T-shirt, with a handsome face topped by neatly cut blond bangs, waited patiently. He tipped his chair far back against the wall behind him, banging it nonstop, while staring up at the ceiling with a bored, resigned look, breathing hard, seemingly enjoying the loud crashing sounds he made. He kept banging until Monica returned, and he got his two cookies.

“Blanca” kept herself busy with a mimed silent conversation — like a Charlie Chaplin monologue — in which she seemed to be carefully instructing herself on what to do and what to avoid while waiting for her treats. She even mimed smelling the imagined goodies by pressing her empty hand against her nose.

“Javier,” who had intense, penetrating eyes and an intelligent face, spent the waiting time completely absorbed in what appeared to be a cautious science experiment. Maintaining an expression of total concentration, he seemed to be testing how slowly he could manage to raise and move the bell without ringing it. He elevated it high above his head and, squinting at it intently, transported the bell as far away from himself as possible on the desktop, stretching the journey to make it as long and slow as he could. It was an awesome feat of psychomotor control and imagination from what looked like a budding scientist.

Monica gave the same instructions to “Roberto,” a neatly dressed six-year-old with a beige school jacket, dark necktie on his white shirt, and perfectly combed hair. As soon as she left the room he cast a quick look at the door to be sure it was tightly shut. He then rapidly surveyed the cookie tray, licked his lips, and grabbed the closest treat. He cautiously opened the cookie to expose the white cream filling in its middle, and, with bent head and busy tongue,

he began to lick the cream meticulously, pausing for only a second to smilingly approve his work. After licking the cookie clean, he skillfully put the two sides back together with even more obvious delight and carefully returned the filling-free cookie to the tray. He then hurried at top speed to give the remaining two cookies the identical treatment. After devouring their insides, Roberto arranged the remaining pieces on the tray to restore them to their exact original positions, and checked the scene around him, scanning the door to be sure that all was well. Like a skilled method actor, he then slowly sank his head to place his tilted chin and cheek on the open palm of his right hand, elbow resting on the desktop. He transformed his face into a look of utter innocence, his wide, trusting eyes staring expectantly at the door in childlike innocent wonder.

Roberto's performance invariably gets the most cheers and the loudest laughter and applause from every audience, including, once, a congratulatory shout from the esteemed provost of one of America's top private universities to "get him a scholarship when he's ready to come here!" I don't think he was joking.

## PREDICTING THE FUTURE?

The Marshmallow Test was not designed as a "test." In fact, I have always had serious doubts about most psychological tests that try to predict important real-life behavior. I've often pointed to the limitations of many of the personality tests commonly used, and I've resolved never to create one myself. My students and I designed the procedure not to test children to see how well they did, but rather to examine what enabled them to delay gratification if and when they wanted to. I had no reason to expect that how long a preschooler waited for marshmallows or cookies



would predict anything worth knowing about their later years, especially since attempts to predict long-term consequential life outcomes from psychological tests very early in life had been spectacularly unsuccessful.<sup>4</sup>

However, several years after the marshmallow experiments began I started to suspect some connection between children's behavior in our experiments and how they fared later in life. My daughters had all attended the Bing school, and as the years passed I sometimes asked them how their friends from preschool were doing. Far from systematic follow-up, this was just idle dinnertime conversation: "How's Debbie?" "How's Sam doing?" By the time the kids were early teenagers, I started asking them to rate their friends on a scale of zero to five to indicate how well they were doing socially and in school, and I noticed what looked like a possible link between the preschoolers' results on the Marshmallow Test and my daughters' informal judgments about their progress. Comparing these ratings with the original data set, I saw a clear correlation emerging, and I realized that my students and I had to study this seriously.

It was 1978 and Philip K. Peake, now a senior professor at Smith College, was then my new graduate student at Stanford. Phil, working closely and often around the clock with other students, especially Antonette Zeiss and Bob Zeiss, was instrumental in designing, launching, and pursuing what became the Stanford longitudinal studies of delay of gratification. Beginning in 1982, our team sent out questionnaires to the reachable parents, teachers, and academic advisers of the preschoolers who had participated in the delay research. We asked about all sorts of behaviors and characteristics that might be relevant to impulse control, ranging from the children's ability to plan and think ahead, to their skills and effectiveness at coping with personal and social problems (for example, how well

they got along with their peers), to their academic progress.

More than 550 children who were enrolled in Stanford University's Bing preschool between 1968 and 1974 were given the Marshmallow Test. We followed a sample of these participants and assessed them on diverse measures about once every decade after the original testing. In 2010, they reached their early to midforties, and in 2014, we are continuing to collect information from them, such as their occupational, marital, physical, financial, and mental health status. The findings surprised us from the start, and they still do.

## ADOLESCENCE: COPING AND ACHIEVEMENT

In the first follow-up study, we mailed small bundles of questionnaires to their parents and asked them to "think about your child in comparison to his or her peers, such as classmates and other same-age friends. We would like to get your impression of how your son or daughter compares to those peers." They were to rate their children on a scale of 1 to 9 (from "Not at all" to "Moderately" to "Extremely"). We also obtained similar ratings from their teachers about the children's cognitive and social skills at school.<sup>5</sup>

Preschoolers who delayed longer on the Marshmallow Test were rated a dozen years later as adolescents who exhibited more self-control in frustrating situations; yielded less to temptation; were less distractible when trying to concentrate; were more intelligent, self-reliant, and confident; and trusted their own judgment. When under stress they did not go to pieces as much as the low delayers did, and they were less likely to become rattled and disorganized or revert to immature behavior. Likewise, they thought ahead and planned more, and when motivated they were more able to pursue their goals. They were also more

attentive and able to use and respond to reason, and they were less likely to be sidetracked by setbacks. In short, they managed to defy the widespread stereotype of the problematic, difficult adolescent, at least in the eyes and reports of their parents and teachers.

To measure the children's actual academic achievement, we asked parents to provide their children's SAT verbal and quantitative scores, when available. The SAT is the test in the United States that students routinely take as part of their application for college admission. To assess the reliability of the scores reported by the parents, we also contacted the Educational Testing Service, which administered the test. Preschoolers who delayed longer on the whole earned much better SAT scores.<sup>6</sup> When the SAT scores of children with the shortest delay times (bottom third) were compared with those of children with longer delay times (top third), the overall difference in their scores was 210 points.<sup>7</sup>

## ADULTHOOD

Around age twenty-five to thirty, those who had delayed longer in preschool self-reported that they were more able to pursue and reach long-term goals, used risky drugs less, had reached higher educational levels, and had a significantly lower body mass index.<sup>8, 9</sup> They were also more resilient and adaptive in coping with interpersonal problems and better at maintaining close relationships (discussed in [Chapter 12](#)). As we continued to follow the participants over the years, the findings from the Bing study became more surprising in their sweep, stability, and importance: if behavior on this simple Marshmallow Test in preschool predicted (at statistically significant levels) so much for so long about how well lives turned out, the public policy and educational implications had to be

considered. What were the critical skills that enabled such self-control? Could they be taught?

But perhaps what we were finding was a fluke, limited to what had been happening at Stanford, in the 1960s and early 1970s in California, at the height of the counterculture and the Vietnam War. In order to test this, my students and I launched a number of other studies with very different cohorts — not from the privileged Stanford campus community, but from very different populations and eras, including the public schools of the South Bronx in New York City decades after the Stanford studies had begun.<sup>10</sup> And we found that things played out in similar ways with children living in extremely different settings and circumstances, which I describe in further detail in [Chapter 12](#).

## MIDLIFE BRAIN SCANS

Yuichi Shoda, now a professor at the University of Washington, and I have worked closely together since he started graduate school in psychology at Stanford in 1982. When, beginning in 2009, the Bing school participants reached their midforties, Yuichi and I organized a team of cognitive neuroscientists from several different institutions in the United States to conduct another follow-up study. This team included John Jonides at the University of Michigan, Ian Gotlib at Stanford, and BJ Casey at Weill Cornell Medical College. These colleagues were experts in social neuroscience, a field that focuses on understanding how the brain's mechanisms underpin what we think, feel, and do. They study these mechanisms with methods like functional magnetic resonance imaging (fMRI), which shows brain activity while an individual performs various mental tasks.

We wanted to test for possible differences in the brain scans of people whose lifelong trajectories, beginning with the Marshmallow Test, had been consistently either high or low on self-control measures. We invited a group of our Bing Nursery School alumni, who were now scattered in various parts of the country, to return for a few days to the Stanford campus, revisit the Bing school if they wanted, and take some cognitive tests, both while inside and outside the brain scanner at the Stanford School of Medicine, located on the same campus.

The brain images of these alumni revealed that those who had been more able to resist the marshmallow temptation in preschool and remained consistently high in self-control over the years displayed distinctively different activity in their frontostriatal brain circuitries — which integrate motivational and control processes — than those who hadn't.<sup>11</sup> In the high delayers, the prefrontal cortex area, which is used for effective problem solving, creative thinking, and control of impulsive behavior, was more active. In contrast, in the low delayers, the ventral striatum was more active, especially when they were trying to control their reactions to emotionally hot, alluring stimuli. This area, located in the deeper, more primitive part of the brain, is linked to desire, pleasure, and addictions.

Discussing these findings with the press, BJ Casey noted that whereas low delayers seemed to be driven by a stronger engine, high delayers had better mental brakes. This study made a key point. Individuals who had lifelong low self-control on our measures did not have difficulty controlling their brains under most conditions of everyday life. Their distinctive impulse control problems in behavior and in their brain activity were evident only when they were faced with very attractive temptations.

## 2

### HOW THEY DO IT

THE MARSHMALLOW TEST AND decades of subsequent studies showed us that self-control ability early in life is immensely important for how the rest of life plays out, and that this ability in the young child can be assessed at least roughly on a simple measure. The challenge was then to untangle the underlying mental and brain mechanisms that let some children wait for what seems like an unbearable amount of time during the test, while others ring the bell within seconds. If the conditions that facilitate self-control, and those that undermine it, could be identified, perhaps they could be harnessed to teach people who have trouble waiting to be better at it.

I chose preschoolers for the research because watching the changes in my own children suggested that this was the age at which youngsters begin to understand the contingency. They can grasp that if they choose the smaller treats now it prevents them from getting the more preferred treats later. It is also the age at which important individual differences in this ability become clearly visible.

### DISTRACTION STRATEGIES

Many miracles seem to occur in the transformations from birth to crawling, talking, walking, and heading to preschool. No change was more remarkable to me than a child's transition from distressed howling for help to being