

play

*How It Shapes the Brain,
Opens the Imagination,
and Invigorates the Soul*

STUART BROWN, M.D.,
with CHRISTOPHER VAUGHAN

Avery • a member of Penguin Group (USA) Inc. • New York

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Table of Contents

[Title Page](#)

[Copyright Page](#)

[Dedication](#)

[Part One - why play?](#)

[Chapter One - the promise of play](#)

[Chapter Two - what is play, and why do we do it?](#)

[Chapter Three - we are built for play](#)

[Part Two - living the playful life](#)

[Chapter Four - parenthood is child's play](#)

[Chapter Five - the opposite of play is not work](#)

[Chapter Six - playing together](#)

[Chapter Seven - does play have a dark side?](#)

[Chapter Eight - a world at play](#)

[Acknowledgements](#)

[Index](#)

[Photography Credits](#)

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To my children:

Caren, who brought me the joy of attunement, and from whom I continue to learn.

Colin, whose life is empowered by play and joy.

Barry, who deftly combines compassion and play, inspiring us all.

Lauren, selfless, inventive, and fun, showing that life can be a playground.

And to their mother, Joan, for grounding them in love.



Part One

why play?

Chapter One

the promise of play

After five hours of driving over the tire-melting highways of the Nevada and Utah deserts, I am beat. My yellow Lab, Jake, shares the emotion. He is draped across the backseat, all the air let out of him. The last ten miles of our journey is an unpaved, rattling road up to my cousin Al's ranch, so it is half an hour more before I shut down the engine and the dust cloud that has been following us blankets the car.

Then something miraculous occurs.

I open the door for Jake and he freezes, every sense aquiver. He instantly takes in the whole scene: a bright August day, four acres of pasture, a dozen horses, my cousin Al, his four kids, and two dogs. A light breeze rustles aspen leaves, wafting scents of hay and horses across the Utah ranch. Dog heaven.

In half a second Jake is flying out the door, a blond blur zipping toward the pasture. He races at full gallop one way and reverses, paws tearing up the dust in a skidding turn, then accelerates to waist speed in the opposite direction. His mouth is agape, the corners pulled back in a canine grin, his tongue lolling out one side.

Jake blasts into the maze of animals without hesitation. I worry about how the horses will react, but they don't shy. In a flicker the horses are jumping and gamboling. It seems that we all—adults, kids, dogs, horses—recognize that Jake is consumed with the joy of play. All of us are caught up in the moment.

Jake initiates a free-for-all game of follow the leader. He darts from horse, to person, to dog, to pony, to person, and back to horse in an outstanding display of speed, athleticism, and pure exuberance. Jake shoulder-checks another dog and sends him flying, but he doesn't lose a bit of speed and the other dog is right back up and into the chase. The children squeal with delight and run after Jake as he does figure eights. The adults are soon whooping and running. Even some observing magpies get caught up in the act, swooping over the melee.

The moment is captivating, gleeful, unexpected, and short-lived. After thirty seconds the horses scatter and the dogs lie down, panting and cooling their bellies in the grass. All of us feel completely exuberant. We catch our breath and laugh. The tension and fatigue of the drive has fallen from my shoulders. The kids are giggling. The rest of the day has a lightness and ease that I hadn't felt for a long time.

On that day, Jake gave a compact demonstration of what years of academic and clinical research has taught me about the power of play. Most obviously, it is intensely pleasurable. It energizes us and enlivens us. It eases our burdens. It renews our natural sense of optimism and opens us up to new possibilities.

Those are all wonderful, admirable, valuable qualities. But that is just the beginning of the story. ~~Neuroscientists, developmental biologists, psychologists, social scientists, and researchers from every~~ point of the scientific compass now know that play is a profound biological process. It has evolved over eons in many animal species to promote survival. It shapes the brain and makes animals smarter and more adaptable. In higher animals, it fosters empathy and makes possible complex social groups. For us, play lies at the core of creativity and innovation.

Of all animal species, humans are the biggest players of all. We are built to play and built through play. When we play, we are engaged in the purest expression of our humanity, the truest expression of our individuality. Is it any wonder that often the times we feel most alive, those that make up our best memories, are moments of play?

That is something that struck me as I was reading obituaries of those who lost their lives on September 11, 2001, stories I began collecting because they were such poignant and gripping portraits. Soon I realized that what people most remembered about those who died were play moments or play activities. The March 31, 2002, edition of *The New York Times*, to take one example, has obituaries with these headlines: “A Spitball-Shooting Executive,” “A Frank Zappa Fan,” “The Lawn King: A Practical Joker with a Heart,” “A Lover of Laughter.” What dominated the profiles beneath the headlines were remembrances of play states with loved ones, which were like joyful threads running through their lives, weaving memories and binding them together emotionally.

I HAVE SPENT a career studying play, communicating the science of play to the public, and consulting for Fortune 500 companies on how to incorporate it into business. I have used play therapies to help people who are clinically depressed. I frequently talk with groups of parents who inevitably are concerned and conflicted about what constitutes healthy play for their kids. I have gathered and analyzed thousands of case studies that I call play histories. I have found that remembering what play is all about and making it part of our daily lives are probably the most important factors in being a fulfilled human being. The ability to play is critical not only to being happy, but also to sustaining social relationships and being a creative, innovative person.

If that seems to be a big claim, consider what the world would be like without play. It's not just an absence of games or sports. Life without play is a life without books, without movies, art, music, jokes, dramatic stories. Imagine a world with no flirting, no day-dreaming, no comedy, no irony. Such a world would be a pretty grim place to live. In a broad sense, play is what lifts people out of the mundane. I sometimes compare play to oxygen—it's all around us, yet goes mostly unnoticed and unappreciated until it is missing.

But what happens to play in our lives? Nearly every one of us starts out playing quite naturally. As children, we don't need instruction in how to play. We just find what we enjoy and do it. Whatever “rules” there are to play, we learn from our playmates. And from our play we learn how the world works, and how friends interact. By playing, we learn about the mystery and excitement that the world can hold in a tree house, an old tire swing, or a box of crayons.

At some point as we get older, however, we are made to feel guilty for playing. We are told that it is

unproductive, a waste of time, even sinful. The play that remains is, like league sports, mostly ve organized, rigid, and competitive. We strive to always be productive, and if an activity doesn't teach us a skill, make us money, or get on the boss's good side, then we feel we should not be doing it. Sometimes the sheer demands of daily living seem to rob us of the ability to play.

The skeptics among the audiences I talk to will say, "Well, duh. Of course you will be happy if you play all the time. But for those of us who aren't rich, or retired, or both, there's simply no time for play." Or they might say that if they truly gave in to the desire to experience the joy of free play, they would never get anything done.

This is not the case. We don't need to play all the time to be fulfilled. The truth is that in most cases, play is a catalyst. The beneficial effects of getting just a little true play can spread through our lives, actually making us more productive and happier in everything we do.

One example of this is Laurel, the CEO of a successful commercial real estate company. During her late twenties, Laurel married and had two children, all while establishing her business. Her relationship with her husband was close and compatible, and she adored her four-and ten-year-olds. She saw herself as blessed and fortunate.

Her days hummed like a turbocharged engine. Up at five, she usually ran four or five miles on odd days and swam and lifted weights on even days. She didn't work weekends and usually had enough steam left for "quality time" with her supportive husband and kids, church, and her closest friends.

She felt that she had a healthy mix of play and work, but when she passed forty she began to dread her schedule. She didn't yet feel a need to quit any of her commitments or ease off, but slowly she realized that though she had fun with her husband and kids and a sense of enthusiasm about her work, she was missing . . . joy.

So Laurel set about finding where it had gone. She remembered back to her earliest joyful memories and realized they centered on horses. As she reconstructed her own play history, she realized that horses had grabbed her from the first time she saw one. As a toddler she loved bouncing on her hobbyhorse. One of her fondest memories was befriending a local backyard horse and secretly riding it at age seven. She would entice the horse to the fence with carrots and coax it to allow her to climb up and ride bareback, completely unbeknownst to the owner or her parents. As dangerous as it was for a seven-year-old to ride this way, it gave Laurel a sense of her own power. Later she started hanging around stables, becoming an accomplished horsewoman and as a young adult competing as a professional rider. She eventually burned out on horse shows and settled into marriage and business.

Yet she now realized she longed "just to ride."

Laurel decided to make this happen. She found a horse to lease and began to ride again. The feelings of joy and exhilaration came back the first time she climbed onto the horse. Now she makes the time to go riding once a week.

What surprises her most since she incorporated the pure play of riding back into her life is how complete and whole she now feels in all other areas of her life. The bloom of "irrational bliss" she experiences in the care of her horse, from riding it regularly, and even occasionally riding again at small local shows, has spilled over into her family and work lives. The little chores of daily living don't seem so difficult anymore.

She is also surprised by the subtle shift in her relationship with her husband. "It's just easier now."

look forward to talking more often now,” Laurel says. Before rediscovering her horse-based play when she approached her husband for a discussion she was defensively anticipating difficulties thinking of things that needed doing. “It felt more like job-sharing than being a couple.”

At some offices, play is becoming increasingly recognized as an important component of success. And I’m not just talking about Ping-Pong tables in the break room. Employees who have engaged in play throughout their lives outside of work and bring that emotion to the office are able to do well on work-related tasks that at first might seem to have no connection at all to play.

An example: Cal Tech’s Jet Propulsion Laboratory (JPL) has been the United States’ premier aerospace research facility for more than seven decades. The scientists and engineers at JPL have designed and managed major components of every manned and unmanned mission of our time, and have been completely responsible for dreaming up, building, and operating complex projects like the robot vehicles that landed on Mars and explored the planet’s surface for years. You might say that JPL invented the Space Age. No matter how big and ambitious the goal, the researchers could always be relied on to say, “We can do that.”

But in the late nineties, the lab’s management was saying, “JPL, we have a problem.” As the lab neared the new century, the group of engineers and scientists who had come on board in the 1960s—those who put men on the moon and built robotic probes to explore the solar system, were retiring in large numbers. And JPL was having a hard time replacing them. Even though JPL hired the top graduates from top engineering schools like MIT, Stanford, and even Cal Tech itself, the new hires were often missing something. They were not very good at certain types of problem solving that are critical to the job. The experienced managers found that the newly minted engineers might excel at grappling with theoretical, mathematical problems at the frontiers of engineering, but they didn’t do well with the practical difficulties of taking a complex project from theory to practice. Unlike the elders, the young engineers couldn’t spot the key flaw in one of the complex systems they were working on, toss the problem around, break it down, pick it apart, tease out its critical elements, and rearrange them in innovative ways that led to a solution.

Why was JPL hiring the wrong sorts of engineers? The people JPL brought aboard had earned the highest grades at the best schools, but academic excellence was obviously not the most important measure of the graduates’ problem-solving skills. Like good engineers, JPL management analyzed the problem and concluded that when hiring they were looking at the wrong data. Those job candidates good at problem solving and those who were not could be sorted, they believed, if they found the right metrics.

Then the head of JPL found Nate Jones. Jones ran a machine shop that specialized in precision racing and Formula One tires, and he had noticed that many of the new kids coming in to work at the shop were also not able to problem solve. Jones and his wife, who is a teacher, wondered what had changed. After questioning the new kids and the older employees, Jones found that those who had worked and played with their hands as they were growing up were able to “see solutions” that those who hadn’t worked with their hands could not. Jones wrote an article about what he had found, which is how he came to the attention of JPL management.

The JPL managers went back to look at their own retiring engineers and found a similar pattern. They found that in their youth, their older, problem-solving employees had taken apart clocks to see how they worked, or made soapbox derby racers, or built hi-fi stereos, or fixed appliances. The young

engineering school graduates who had also done these things, who had played with their hands, were adept at the kinds of problem solving that management sought. Those who hadn't, generally were not. From that point on, JPL made questions about applicants' youthful projects and play a standard part of job interviews.

What Laurel discovered through experience, the JPL managers discovered through research: there is a kind of magic in play. What might seem like a frivolous or even childish pursuit is ultimately beneficial. It's paradoxical that a little bit of "nonproductive" activity can make one enormously more productive and invigorated in other aspects of life. When an activity speaks to one's deepest truth, like horseback riding did for Laurel, it is a catalyst, enlivening everything else.

Once people understand what play does for them, they can learn to bring a sense of excitement and adventure back to their lives, make work an extension of their play lives, and engage fully with the world.

I don't think it is too much to say that play can save your life. It certainly has salvaged mine. Life without play is a grinding, mechanical existence organized around doing the things necessary for survival. Play is the stick that stirs the drink. It is the basis of all art, games, books, sports, movies, fashion, fun, and wonder—in short, the basis of what we think of as civilization. Play is the vibrant essence of life. It is what makes life lively.

When people know their core truths and live in accord with what I call their "play personality," the result is always a life of incredible power and grace. British educator Sir Ken Robinson has spoken about finding such power and grace in the life of dancer Gillian Lynne, who was the choreographer for the musicals *Cats* and *Phantom of the Opera*. Robinson interviewed her for a book he is writing, titled *Epiphany*, about how people discover their path in life. Lynne told him about growing up in 1930s Britain, about doing terribly in school because she was always fidgeting and never paid attention in lessons. "I suppose that now people would say she had ADHD, but people didn't know you could have that then," Robinson says wryly. "It wasn't an available diagnosis at the time."

Instead, school officials told Lynne's parents that she was mentally disabled. Lynne and her mother went to see a specialist, who talked to Gillian about school while the girl sat on her hands, trying not to fidget. After twenty minutes, the doctor asked to speak to Lynne's mother alone in the hallway. As they were leaving the office, the doctor flipped on the radio, and when they were shut in the hallway, the doctor pointed through the window back into the office. "Look," he said, and directed the mother's attention to Gillian, who had gotten up and started moving to the music as soon as they left. "Mr. Lynne," said the doctor, "your daughter's not sick, she's a dancer."

The doctor recommended enrolling her daughter in dance school. When Gillian got there she was delighted to find a whole room of people like herself, "people who had to move to think," as Lynne explained it. Lynne went on to become a principal dancer in the Royal Ballet, then founded her own dance company and eventually began working with Andrew Lloyd Webber and other producers.

"Here is a woman who has helped put together some of the most successful musical productions in history, has given pleasure to millions, and is a multimillionaire," Robinson says. Of course if she were a child now, he adds, "someone would probably put her on drugs and tell her to calm down."

Robinson's story about Lynne was really about the strength and beauty of living in accordance with who she is—which for her meant living a life of motion and music. If her parents and teachers tried to make her into an engineer, Lynne would have been unhappy and unsuccessful.

ULTIMATELY, THIS BOOK is about understanding the role of play and using it to find and express our own core truths. It is about learning to harness a force that has been built into us through millions of years of evolution, a force that allows us to both discover our most essential selves and enlarge our world. We are designed to find fulfillment and creative growth through play.

Chapter Two

what is play, and why do we do it?

what is play? i hate to say

What are we talking about when we talk about play? Though I have studied play for decades, I have long resisted giving an absolute definition of play because it is so varied. For one person, dangling hundreds of feet above the ground, held there by only a few callused fingers on a granite cliff face, is ecstasy. For someone else, it is stark terror. Gardening might be wonderful fun for some but a sweaty bore for others.

Another reason I resist defining play is that at its most basic level, play is a very primal activity. It is preconscious and preverbal—it arises out of ancient biological structures that existed before our consciousness or our ability to speak. For example, the natural tussling of sibling kittens just happens. In us, play can also happen without a conscious decision that, okay, I'm going to play now. Like digestion and sleep, play in its most basic form proceeds without a complex intellectual framework.

Finally, I hate to define play because it is a thing of beauty best appreciated by experiencing it. Defining play has always seemed to me like explaining a joke—analyzing it takes the joy out of it.

I was forced out of this stance by Lanny Vincent, a colleague and friend who is an accomplished business consultant. Lanny and I were making a presentation to a group of Hewlett-Packard engineers and shortly before I spoke, Lanny asked me what definition of play I planned to present.

I adopted my usual academic stance. "I don't really use an absolute definition," I said. "Play is so varied, it's preverbal, preconscious . . ."

Lanny was having none of it. "You can't go out there without a definition. These are engineers. They design machines. They munch on mountains of specs and wash them down with streams of data. If you don't have a definition they will eat you alive."

Lanny's portrayal of engineers as threatening technological Paul Bunyans was an exaggeration, of course, but he was basically right. Engineers are professional skeptics. To them, good things are hard to come by and useful ideas last, like laws of nature. Engineers build on the bedrock of established fact. They usually regard emotional components of a system as too vague to be useful. But play inevitably has an emotion-laden context that is essential for understanding. I could see that without some foundation or definition, they were going to see the field of play as very squishy, marshy ground on which to build.

Luckily, from my own scientific training I knew that what I needed was a good chart. Nothing soothes the restive natives of Techland like charts, graphs, and data. With that in mind, I quickly put together a couple slides laying out the properties of play. Here is what I showed them:

PROPERTIES OF PLAY

Apparently purposeless (done for its own sake)

Voluntary

Inherent attraction

Freedom from time

Diminished consciousness of self

Improvisational potential

Continuation desire

What do these mean? As I explained to the engineers, the first quality of play that sets it off from other activities is its apparent purposelessness. Play activities don't seem to have any survival value. They don't help in getting money or food. They are not done for their practical value. Play is done for its own sake. That's why some people think of it as a waste of time. It is also voluntary—it is not obligatory or required by duty.

Play also has inherent attraction. It's fun. It makes you feel good. It provides psychological arousal (that's how behavioral scientists say that something is exciting). It is a cure for boredom.

Play provides freedom from time. When we are fully engaged in play, we lose a sense of the passage of time. We also experience diminished consciousness of self. We stop worrying about whether we look good or awkward, smart or stupid. We stop thinking about the fact that we are thinking. In imaginative play, we can even be a different *self*. We are fully in the moment, in the zone. We are experiencing what the psychologist Mihaly Csikszentmihalyi calls "flow."

Another hallmark of play is that it has improvisational potential. We aren't locked into a rigid way of doing things. We are open to serendipity, to chance. We are willing to include seemingly irrelevant elements into our play. The act of play itself may be outside of "normal" activities. The result is that we stumble upon new behaviors, thoughts, strategies, movements, or ways of being. We see things in a different way and have fresh insights. For example, an artist or engineer at the beach might have new ideas about their work while building a sand castle. A kid playing tea party might come to understand that good manners and social conventions can provide safety and power rather than being something imposed merely to make her feel uncomfortable. Those insights weren't the reason they played, but they arrived as the result of it. You never really know what's going to happen when you play.

Last, play provides a continuation desire. We desire to keep doing it, and the pleasure of the experience drives that desire. We find ways to keep it going. If something threatens to stop the fun, we improvise new rules or conditions so that the play doesn't have to end. And when it is over, we want to do it again.

These properties are what make play, for me, the essence of freedom. The things that most tie you down or constrain you—the need to be practical, to follow established rules, to please others, to make good use of time, all wrapped up in a self-conscious guilt—are eliminated. Play is its own reward, its own reason for being.

I also showed the engineers a framework for play devised by Scott Eberle, an intellectual historian of play and vice president for interpretation at the Strong National Museum of Play in Rochester, New York. Eberle feels that most people go through a six-step process as they play. While neither he nor I believe that every player goes through exactly these steps in this order, I think it's useful to think of play in this way. Eberle says that play involves:

Anticipation, waiting with expectation, wondering what will happen, curiosity, a little anxiety perhaps because there is a slight uncertainty or risk involved (can we hit the baseball and get safely on base?), although the risk cannot be so great that it overwhelms the fun. This leads to . . .

Surprise, the unexpected, a discovery, a new sensation or idea, or shifting perspective. This produces . . .

Pleasure, a good feeling, like the pleasure we feel at the unexpected twist in the punch line of a good joke. Next we have . . .

Understanding, the acquisition of new knowledge, a synthesizing of distinct and separate concepts, an incorporation of ideas that were previously foreign, leading to . . .

Strength, the mastery that comes from constructive experience and understanding, the empowerment of coming through a scary experience unscathed, of knowing more about how the world works. Ultimately, this results in . . .

Poise, grace, contentment, composure, and a sense of balance in life.

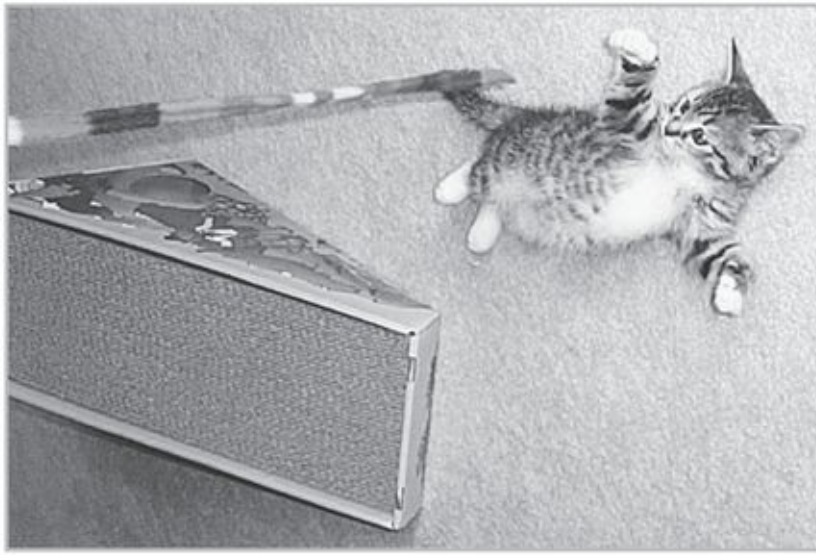
Eberle diagrams this as a wheel. Once we reach poise, we are ready to go to a new source of anticipation, starting the ride all over again.

When I flashed these slides on the screen, I could see the engineers relax, as if they had been lost but now caught sight of a familiar landmark. The rest of the talk went very smoothly, and afterwards many of them told me that they saw play in a new light.

The Dutch historian Johan Huizinga offers another good definition of play. He describes it as 'free activity standing quite consciously outside 'ordinary' life as being 'not serious' but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest and no profit can be gained from it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy.'

This parallels the definition I use in many ways, although I don't think the "rules" have to be fixed or that there even have to be rules at all. I do agree that play often promotes social interaction and that it fosters new terminologies and customs that set a group apart, but it doesn't have to promote secrecy. Indeed, one of the hallmarks of play is that *anyone* can do it.

In the end, for me, all of these definitions fall short. I can create a thousand PowerPoint slides chock-full of diagrams, charts, and definitions, but there is no way to really understand play without also remembering the feeling of play. If we leave the emotion of play out of the science, it's like throwing a dinner party and serving pictures of food. The guests can understand all they care to about how the food looks and hear descriptions of how the food tastes, but until they put actual food in their mouths they won't really appreciate what the meal is all about.



I've sometimes found that just a few slides of kids playing hop-scotch, or a cat playing with string, or dogs playing fetch, creates more recognition and understanding than all the statistical analysis of the world.

why do we play?

Hudson seemed to be a very dead dog. That's what musher Brian La Doone thought as he watched a twelve-hundred-pound polar bear quickstep across the snowfield, straight toward the sled dogs that were staked away from his camp. That November, the polar bears in the Canadian far north were hungry. The sea had not yet frozen, denying the bears access to the seals that they hunted from the ice. La Doone spent much of his life in the polar bear's territory, and judging from the appearance of this particular bear he knew it had not eaten in months. With a skull-crushing bite or a swipe of its massive claws, the bear could easily rip open one of his dogs within seconds.

But Hudson had other things on his mind. Hudson was a six-year-old Canadian Eskimo sled dog, one of La Doone's more rambunctious pack members. As the polar bear closed in, Hudson didn't bark or flee. Instead, he wagged his tail and bowed, a classic play signal.

To La Doone's astonishment, the bear responded to the dog's invitation. Bear and sled dog began a playful romp in the snow, both opening their mouths without baring their teeth, with "soft" eye contact and flattened hair instead of raised hackles—all signaling that each was not a threat.

In retrospect, the play signals began, even before the two came together. The bear approached Hudson in a loping way. His movements were curvilinear instead of aggressively straightforward. When predators stalk, they stare hard at their prey and sprint directly at it. The bear and the dog were exchanging play signals with these sorts of curving movements as the bear approached.



The two wrestled and rolled around so energetically that at one point the bear had to lie down, belly up: a universal sign in the animal kingdom for a time-out. At another point during their romp, the bear paused to envelope Hudson in an affectionate embrace.

After fifteen minutes, the bear wandered away, still hungry but seemingly sated by this much-needed dose of fun. La Doone couldn't believe what he'd just witnessed, and yet he was even more astonished when the same bear returned the next day around the same time for another round of frolicking with Hudson. By the third day, La Doone's colleagues had heard about this interspecific wrestling match and his campsite was filled with visitors eager to catch a glimpse of the two new bear friends. Every night for a week, the polar bear and Hudson met for a playdate. Eventually, the ice on the bay thickened enough for the famished but entertained polar bear to return to his hunting grounds for seal.



What was it in these animals' nature that was strong enough to overcome hunger and survival instincts? How can two species that don't interact peacefully read each other's intentions well enough to roughhouse and play-fight, when any misunderstanding could become deadly? As I began to look at these sorts of questions, I started to see that play is a tremendously powerful force throughout nature. In the end, it is largely responsible for our existence as sentient, intelligent creatures.

understanding the biology of play

As with the polar bear and the Canadian Eskimo sled dog, you can see an impulse to play in humans. My first scientific clue about the biological importance of play came to me while I was a medical student during my pediatrics rotation at Texas Children's Hospital, part of Baylor College of Medicine in Houston. We would get up early to make rounds. It was an unnerving place at dawn, few adults, no sounds except from the sick kids or the regular beeping and humming of machines that kept the

alive.

The kids who ended up in the hospital were for the most part really sick. They had congenital disorders, metabolic disorders, or serious infectious diseases like meningitis. One particular kid that I remember was about two years old and had lymphocytic choriomeningitis, a potentially fatal viral infection that could not be treated with antibiotics. We had to sustain him on IVs, support his vital functions—and keep monitoring him with a battery of laboratory tests—hoping that he would get better rather than worse.

Like most kids who are recovering from a serious illness, he didn't respond to much outside stimuli. But one morning as I walked into his room for my morning rounds, I greeted him with "Hi Ivan," and he returned my hello with a big smile. Then he reached out to me. His smile was a sign that joy had returned to his life and was an invitation for me to join him in that feeling. I smiled back and held his hand. Later the same day, I checked his lab tests. They showed no change. But the next day, his test showed signs of improvement.

I was intrigued. All standard medical signs had shown no change, and yet something was going on in Ivan's body. In a way not measurable by medical tests, Ivan had turned the corner that day. And the very first thing to come back to normal was not his blood sugar, heart rate, blood pressure, blood electrolytes, cell counts, or any of the other twenty-five "objective" signs. What came back first was his smile. This was not just relief from discomfort, but a play signal. When anyone smiles at another person, they are reaching out, engaging in a play invitation as clear as a dog's play bow. Ivan's first visible sign of returning health was an invitation to play.

I noted this surprising fact, but began to understand it only in retrospect, after I had been studying play for some time.

In the years that followed, I studied a range of people from all walks of life—from murderers and businesspeople, socialites, scientists, artists, and even Nobel Prize winners—and systematically mapped how their unique "play histories," a careful review of the role of play in childhood and adulthood, affected their life course. On one end of the spectrum, I studied murderers in Texas prisons and found that the absence of play in their childhood was as important as any other single factor in predicting their crimes. On the other end, I also documented abused kids at risk for antisocial behavior whose predilection for violence was diminished through play.

play in the animal kingdom

By the 1990s, I had studied play and its lack extensively in humans, but I began to realize that if I really wanted to understand what play does for us, I would have to know about how it operates in other animal species. I would have to place the behavior in a biological and evolutionary context. I sometimes say that I'm like James Michener, who begins his book *Hawaii* with lava rising up out of the seabed millions of years ago and ends with hula at the hotel. I needed to look at the really big picture to bring the details into focus.

Interestingly enough, at that point in time, people who had been studying play in humans didn't generally talk to the people who studied it in nonhuman animals, even though there had to be

sample content of Play: How it Shapes the Brain, Opens the Imagination, and Invigorates the Soul

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