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SENSATION

THE NEW SCIENCE OF PHYSICAL INTELLIGENCE

THALMA LOBEL

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The New Science of Physical Intelligence

THALMA LOBEL, PhD

ATRIA BOOKS
New York London Toronto Sydney New Delhi

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To my beloved son Dani

To my beautiful Danielle, Elinor, Natalie, and Dean

Introduction:
The Tangled Web Our Senses Weave

In 2005 I traveled with four friends to Guatemala for two weeks. In a great trip filled with ma exciting new experiences, the highlight was a visit to Tikal National Park to see archaeologic sites dating back to the Mayan civilization.

In the jungle cottages where we stayed, each of us was given a separate room. My husband w not able to travel with me, so I was alone in the room. There was no electricity from 10:00 p.m until the morning. Unable to sleep soundly, I awoke at 2:00 a.m.—to utter and total darkness. was pitch-black. I had no flashlight or cell phone next to my bed, and I saw nothing. Nothin No distant streetlamp, no moonlight, not a star through the window. I could not hear anythin either—the jungle around me was completely still. This was the closest I had ever been to senso deprivation. It was a most unpleasant experience.

At dawn's first light, I got dressed and ran outside. With the sun on my face, hearing th chatter of birds, I felt reborn! No other person was in sight, but I reveled in the beauty and colo of nature and was delighted when a group of armadillos, an animal I had never before see ambled by. I was so grateful that life was not as barren and blank as it had seemed in that da room. In those brief hours of darkness, I had come to realize, in the most emphatic way, the vit connection between our physical senses and our mental states.

It is crucial for us to be able to sense the external world, but at the other extreme from senso deprivation is sensory overload, which can come from living and working in a big city. The urba environment is relentless and bustling—scurrying pedestrians, aggressive drivers, lumbering truc and choking exhaust, kamikaze bike messengers, splashy window displays, the unbroken skyline hard-edged buildings, the screaming heat, and densely packed bodies. I for one love cities li New York, Los Angeles, and Tel Aviv, where I live, but sometimes even I need to get away fro it all—just for a while. Unlike me, other people get agitated by too much stimulation and pref quieter, more natural landscapes in the suburbs or countryside.

Between these two poles lies an entire spectrum of stimuli. Total sensory deprivation a stimulus bombardment are both bad for us. Yet wherever we are, we are constantly exposed environmental stimuli and cues. We touch things that have different temperatures and texture we smell good and bad odors, we see myriad colors, and we lift objects to sense their weight. W experience much of our world quite consciously through our senses. But without noticing it, w are also unconsciously influenced in the most amazing ways by the physical experiences our sens convey.

In this book, I will take you on a systematic tour of our senses and reveal how your senso experience of the world influences the rational mind you believe you have, as well as th independent thoughts you believe you make. I'll explain why warm temperatures make temporarily friendlier and the color red causes us to perform more poorly on tests. I'll show th drawing close dots on a Cartesian graph makes us feel more emotionally close to others and th résumés fastened to heavy clipboards make a better, more professional impression. And I demonstrate why clean smells, like that of Windex, promote cleaning behavior, while showerin before a test is more likely to lead to cheating. In case these statements sound impossible, I ha to tell you that these findings have been proven repeatedly in lab experiments and published

some of the best peer-reviewed academic journals in the world. These astonishing facts actual point to a new way of understanding how our minds work. And *Sensation* presents these studi to you, the general reader, for the first time.

This book is about the way our sensations influence us. Unseen cues that surround us ma cause us to lose sleep, fail a test, and even fall in love. In the Hans Christian Andersen fairy ta "The Princess and the Pea," only a princess is sensitive enough to feel a pea placed underneat twenty featherbeds and twenty mattresses. But in fact we are all extraordinarily sensitive to th stimuli in our environment. Like the princess, we may not always know what disturbs us under ou radar, but we are nonetheless affected.

Many of the effects of these triggers are short-lived; they "glow" ephemerally in th subconscious for a little while but don't change us permanently. Yet what is brief is not necessari unimportant. Our actions under these triggers' influence can make a significant difference in o effectiveness in business meetings, classrooms, and sports. They can affect how we feel on fi dates and how we're perceived in an interview for a job. This book will raise your awareness these triggers, or "peas," and their effects—on both your own and others' thoughts and actions.

* * *

My research into effects of their environment on people began, basically, when I was eightee years old and a soldier in the Israel Defense Forces, where I was stationed in a classified bunk several stories belowground. I was in my first year at my university, studying psychology, an would work forty-eight-hour shifts at the base so I could leave to attend class, where I would s through lectures about the human mind under extreme conditions. With a slight sense of irony, would then return to a metal cave to work without sleep for another two days straight. My li was basically an experiment.

At the base, we lived and worked under relentless fluorescent lights, breathing the sam recycled air over and over. We napped in small pitch-black rooms, where, during most of my tim underground, I lost track of day and night. Immersed in psychology at the university when I w aboveground, I couldn't help but study every facial expression and odd behavior of my fello soldiers whenever I returned to the bunker. I didn't realize it at the time, but I was alread fascinated by the way our environments shape and influence us. The world became a lab to me.

I received my degree in clinical psychology and followed it with postdoctoral studies Harvard. As a professor of psychology, I studied how stereotypes, personality characteristics, an culture influence our behavior, specializing in the psychology of gender identity in both childre and adults. I designed interesting experiments that were published in prestigious journals, and truly loved what I did.

* * *

Then, in 2008, I read a study by Laurence Williams and John Bargh in *Science*.[1] They had foun that subjects who held warm cups of coffee were more likely to perceive someone else emotionally "warm." The results of this study, and others like it, seemed almost like scienc fiction in their revelation of subtle but profound influences on our thoughts, perceptions, an judgments. They moved me in a way that no studies ever had before. Reading them reminded m of how, after reading a book about psychoanalysis as a senior in high school, I'd been thrilled t discover the power of the unconscious to influence our minds and bodies. The stories of patien

who had suffered from physical symptoms such as paralysis or vision disturbances but were cur by "talking techniques," by becoming aware of unconscious drives that caused their symptom had inspired me to become a psychologist. Now here was another kind of revolution psychology.

But these studies were conducted in a lab, with regular people who did not suffer from a pathological maladies. These new studies examined everyday behaviors, such as interactions wi friends, evaluations of job candidates, and social judgments. Moreover, the studies did not de with hidden or deeply suppressed motives, desires, and fears that unconsciously influence o behavior. Rather, they dealt with physical sensations that we experience all the time and th unconsciously influence our behaviors.

Most of us would like to believe that we exert control over our behavior; so it is somewh disconcerting to discover that seemingly irrelevant environmental factors and physical sensatio affect our behavior all the time. The findings were counterintuitive—and so they were alluring me. I decided to return to research into the association between body and mind, but with th new approach, which is now known as the theory of *embodied cognition*.

* * *

I'd grown up in busy Tel Aviv, but I used to spend summers with my aunt on her kibbutz, whic gave me some of my best childhood memories. In those days, living on the kibbutz was like livi on another planet—no phones, no cars, just endless fields with houses sprouting up here a there. People were different there, calmer; they even wore different expressions on their face Whenever I visited, I noticed that I was different too. We all felt part of a larger landscape a purpose; we were more in touch with the forces of nature and how they ruled our lives a routines. One summer there, I had an epiphany that we are more like sailboats than motorboat even though our hands are on the wheel, the unseen force of the wind matters much more tha we do. Now, as an adult, after a lifetime of studying the mind, I finally have the science embodied cognition to show that the little girl in a field was more right than she then knew.

Temperature, texture, weight, sound, taste, smell, and color, among a symphony of oth physical sensations, affect us every day. We are moved without knowing we are being moved. W feel ownership of and responsibility for our decisions and actions, yet they are greatly influenc and sometimes created by the sensory world around us.

After thirty years of conducting my own studies, studying the research of others, and teachi thousands of students, I am more inspired than ever by this *embodied* material. When I teach m graduate students about these recent studies, I can see their surprise. And when my students and create our own experiments, we surprise ourselves. Several studies, for example, found th people's moral judgments of others are affected by disgusting tastes. Yet I would venture to gue that you, like most people, feel that your moral values come from deep inner convictions that a unassailable by simple, transient changes in your environment.

I'll begin by discussing the effects of temperature on our moods and the decisions we make. turns out there is reason behind why we sometimes blow hot and cold. I believe that you will b as fascinated as my students and I have been with these innovative experiments, the theori behind them, and their implications for your own life.


1

If you've ever been married, you know the rule: The husband is always to blame. My husband ar I have been married for over thirty years and ten years ago decided to sell a small apartment th we owned in Tel Aviv. Although it was a beautiful, white-walled, sunny Bauhaus-style apartmer in the city center, it had become a hassle for us to manage. We had many potential buyers com and go, but one particular newlywed couple kept coming to see it over and over again. On or visit, they even brought in an architect, who measured and fussed all over the place in consultation about remodeling. They clearly wanted to buy.

We talked a little about numbers on their visits, but Israelis are notoriously coy negotiators, ar we had made it nearly to the signing of the final paperwork without yet agreeing on the price. F what would be our last negotiation, we planned to meet the couple at a mutual friend's house t talk over tea. I remember clearly that on the way to that meeting, I believed their offer was to low and I planned to make a firm counteroffer. I practiced in my head all the ways I would ta about the value of the apartment, its great location, and other buyers' interest in it. After w arrived, our hosts poured us all hot cups of black tea, and within ten minutes I found that I ha agreed to the buyers' original—and too low—offer.

When I came home, I was kicking myself, because I had the feeling that we could have easi gotten more if we had insisted. The couple was clearly very invested. Why had we given up easily? Naturally, I decided it must have been my husband's fault. Why hadn't *he* argued? Wh had we agreed so quickly? Maybe we had just gotten tired of the long negotiation and wanted t be done with it. Maybe we just liked the young couple. Years later, I found out that something f simpler was likely to have played a role: the warm cup of tea.

* * *

In 2008, at Yale University, a student named Laurence Williams and his well-known professo John Bargh recruited forty-one students for a psychology study.[1] One by one, the students we led into a lobby, where they were greeted by a young research assistant who guided them to a elevator that would take them to a laboratory on the fourth floor. As part of the experiment, th assistant had her hands full, carrying a stack of books, a clipboard, and a cup of coffee. While the elevator, she asked the participant to hold her coffee for a second, so she could write his or h name and other information on her clipboard. This casual request was actually the most importa part of the experimental procedure. Half of the participants were handed a hot cup of coffee ar the other half an iced coffee. This subtly exposed them to different tactile experiences temperature. Yet they had no idea that what they were being asked to do was significant.

When the participants stepped out of the elevator and into the lab, they were met by anoth experimenter, who sat them down and asked them to read a description of someone called on Person A, who was characterized as skillful, intelligent, determined, practical, industrious, ar cautious. Unbeknownst to the participants, Person A was a fictitious composite character. The were then asked to rate Person A from a list of ten additional traits not included in the writte description. Half of the traits were on the "warm-cold" spectrum—traits that we might associa with "warm" or "cold" personalities—and were identified by words such as *generous* *ungenerous, good-natured* or *irritable, sociable* or *antisocial,* and *caring* or *selfish*. The remainin

traits were unrelated to the warm-cold aspect and included descriptions such as *talkative* or *quie*
strong or *weak*, *honest* or *dishonest*.

Behold the power of holding a warm cup of coffee. Participants who held the hot cup for a fe
moments in the elevator rated Person A as significantly more generous, good-natured, and carin
than did their iced coffee–holding counterparts. People who held the cold cup were far more like
to see Person A as ungenerous, irritable, and selfish. Yet they all felt pretty much the same abou
adjectives unrelated to the warm-cold aspect, no matter which coffee the subjects held before th
sat down.

Could the insignificant act of holding a warm cup of coffee in an elevator really make you s
the people around you as nicer? What was going on here, psychologically speaking?

This finding that physical warmth promotes interpersonal warmth was so surprising that man
scientists raised their eyebrows and asked if it could be true. Yet, as you will soon see, temperatu
influences our reactions to real people just as it affected participants' initial judgments
anonymous people they only read about. Temperature can even influence our perceptions
intimacy and connection.

Although individuals differ in how much they need intimacy and to what extent they a
capable of it, intimacy is an essential component of most relationships. In 2009, two Dutc
researchers explored whether temperature could affect how close people thought they were
others.[2] As in the coffee experiment, the researchers had participants hold warm or co
beverages. The experimenter asked each participant to hold a beverage for a few minutes while h
was pretending to install a questionnaire on the computer.

The experimenter then took the beverages from the participants and asked them to think of
real person they knew and rate how close they were to that person. Participants who were holdin
a warm beverage perceived the person in mind as closer emotionally to them than did those wh
were holding a cold beverage. This is surprising because most of us believe that our most intima
connections are stable on a day-to-day basis— we don't expect them to be influenced by th
temperature of the drink we hold.

Yet our minds do not exist in a vacuum, so our feelings and values can be affected by subt
influences around us. Seemingly irrelevant things that we process through our bodies and o
physical senses do affect our states of mind, mostly without our awareness. The core theory
embodied cognition, the emergent field of psychology that we're exploring, states that there is a
indissoluble link between our decision making and our sensory-motor experiences, such
touching a warm or cold object, and our behaviors, judgments, and emotions.

Conventional psychology historically has been interested in what's going on *inside* people
heads and why they make the mistakes and choices that they do. Psychologists usually study fear
desires, memories, emotions. But what about the *external* context in which we find ourselve
Especially in a performance situation—a job, an audition, an examination, or a sporting event-
the environment outside the contestants' heads also affects why they succeed or fail. An embodie
cognition approach would study how even seemingly insignificant aspects of an auditio
environment—such as the heat of the stage lights, the color of the curtains, and any bright bran
name logos—might influence performance.

Embodied cognition theory proposes that the mind cannot work separately from the physic
world; that the senses provide the bridge to both our unconscious and our conscious thoug
processes. We psychologists and neuroscientists working in this field seek to show the influenc
that physical sensations have over our mental states and behavior.[3] The mind-body connection

evident in everything we do.

Read the following passage:

The warmth of his handshake hid the heavy weight of his memories, but he had shot her down in cold blood and would never again sleep with a clean conscience.

This sentence will not win any literary prizes with its awkward mix of metaphors, but let's loo at it closely. The phrases *warmth of his handshake*, *heavy weight of his memories*, *in cold blood*, an *clean conscience* show that our everyday speech is rooted in the connection between our physic experience and our psychological state.[4] It's difficult even to think of an emotion that doesn carry with it a physical metaphor: isolation is cold, guilt is heavy, cruelty is hard.

Sensation shows that these relations between physical sensations and emotions and behavio are real, not just metaphorical. Physical sensations such as warmth, distance, weight, and man other subtle sensory experiences can (and do) activate and influence our judgments, emotion experiences, and performances. This relationship between physical sensations and psychologic experiences, though complex, reveals itself in a very particular way—as in the cold feeling th arises from loneliness.

A Cold, Lonely Night

Changes in temperature are known to affect our moods and behavior. Pleasant, warm weath improves mood,[5] and heat is associated with aggression and crime rates.[6] In Shakespeare's *Rom and Juliet,* Benvolio warns Mercutio of the air of sweltering violence in Verona's streets. "I pra thee, good Mercutio, let's retire," he says. "The day is hot, the Capulets abroad, and, if we mee we shall not 'scape a brawl, for now, these hot days, is the mad blood stirring." The reality of th relationship is, as always, more complex, but the link itself is clear. Some classical psychologis still hold out against this finding, just as hard-liners hold out against the proof of global clima change, but environmental factors affect our mental states and thoughts in profound ways. As turns out, small talk about the weather may not be so small after all. "How about this weather is actually polite code for "What's going on with you?" The answer to this seemingly innoce question may sometimes influence your judgments and decisions.

My mother used to love to tell this joke: A man and a woman had been dating for fifteen year One day the woman asked the man, "Don't you think it's time we got married?" The ma answered, "Absolutely, but who would marry us? It's a cold world out there." Of course th woman meant that the two of them should marry, but, as the man points out, it's hard to fin someone to be with. People sometimes use this expression, *It's a cold world out there,* whe they're worrying about making bold changes in their lives, such as leaving a spouse or a job. Wh awaits them might be difficult, scary, or lonely—cold.

A friend once told me a sad little story from her youth. When she was thirteen, she was ve excited about going to summer camp with her two best friends. But on the day they we supposed to leave, one of her friends fell ill and the other friend's family changed their plans; all a sudden, she had to go to camp alone. Decades later, as we talked over hot tea in Tel Aviv, sh recounted how cold she had felt every night that summer. Even though summers in Israel are ve warm, her thin blanket wasn't enough to keep her comfortable. The connection between bei

lonely and feeling cold exists in many languages, in songs and poetry. Would my friend hav experienced the temperature that summer differently if her friends had been there?

In North America, in Toronto, average daytime winter temperatures hover just below freezin Residents contend with months of snow, ice, slush, and serious windchill. This is the appropria environment in which two researchers from the University of Toronto investigated the connectio between being cold and feeling lonely. In two experiments, they examined whether physic temperature affects our psychological states, and also whether our feelings affect our perception temperature.[7]

In the first experiment, the researchers asked thirty-two students to recall a situation in whi they felt they were socially excluded and lonely. Think of not being invited to a party, not bein asked to play a game with others, et cetera. Another thirty-two students were asked to think of situation in which they were socially included, like being accepted into a club. The researche then intentionally diverted the students' attention by telling them that the university maintenan staff wanted to know how hot or cold the room was. Would the students please estimate th temperature in the room? The students who recalled being socially excluded actually judged th room as colder than those who had recalled being socially included. The average estimate of tho who remembered being excluded was 70.5 degrees, compared with an average estimate of 75 degrees by those who remembered being included. Yet they all had sat in exactly the same room.

So you see, emotional memories can influence your physical experience in the present. There a powerful connection—even across time—between coldness and loneliness.

The researchers then wanted to go beyond summoning a memory of loneliness and re-crea the experience in the present. So they used a brilliant way of making people feel left out. The invited one group of subjects to play a virtual ball-tossing game. Participants were asked to sit the computer and play online with three other players at different locations. What they didn know was that actually there were no other players; there was only a "cruel" computer progra designed to throw the digital "ball" almost exclusively to the fictitious players in order to mak the real person feel left out. The second group of participants got to play the same ball-tossi game, but with a computer program that was much less discriminatory in its ball tossing. The actual players received the ball intermittently throughout the game and, not surprisingly, had much better time.

After the ball-tossing game, both groups were asked to participate in an ostensibly unrelate marketing task, to rate on a scale of 1 to 7 how much they desired five different products: h coffee, hot soup, an apple, crackers, and an icy Coke. Of course, the participants didn't know th the researchers were in fact interested in the effect of the earlier exclusion, and the researche found that the "excluded" students were significantly more likely to choose something hot tha were the students who were not excluded. They concluded that warmth can be a remedy f loneliness.

Another group of researchers went to a deeper, more somatic level of studying exclusion an examined whether our skin temperature is actually lower when we feel left out.[8] They used th same virtual ball-tossing game as in the previous study, and again the computer was programme for two conditions: inclusion and exclusion. In the inclusion game, participants received the ba every few throws, whereas in the exclusion game they never received the ball. Researche measured participants' finger temperature during the experiment and found that participants wh were excluded really became colder, and their finger temperatures decreased.

Going even further, the researchers conducted an experiment to answer the question, Ca

holding something warm actually improve the feelings of people who have been excluded? Th
asked participants to play the same ball-tossing game and again divided them into excluded a
included groups. This time, however, the researchers programmed the computer to stop aft
three minutes and display an alleged "error." When this happened, a researcher arrived at th
participants' station holding a glass containing either cold or warm tea. All the participan
requested his assistance, and the researcher then asked each participant to hold the beverage wh
he fixed the computer. Afterward, participants were asked to choose whether they had felt "bad
"tense," "sad," or "stressed" and to rate their feeling from 1 to 5. I would certainly ha
predicted that those who had been excluded would report more negative feelings than those wh
had been included, which was true for these participants. The amazing part of the results is th
only those who were excluded and held a cold glass of tea had more negative feelings. For tho
who were excluded but had held a warm glass, their warm hands had warmed their feelings an
apparently, caused them to feel better.

* * *

Taken together, these results clearly show that feeling cold or warm is determined not only by th
temperature of the room but also by your mental state. If you feel lonely, whether you are actual
excluded from an activity or you are in the same room with individuals who do not share yo
opinions, choices, and views, both your physical experience and your psychological experien
actually change. Even if you just stand or sit far from someone or from a group, you feel isolate
The room becomes cold for you. In contrast, if you feel socially accepted, if you are in a roo
with people who share your opinions and preferences and views, or if you just sit close
someone, you feel that the room is warmer.

These findings have direct implications for how we live and should be especially important
teachers, educators, and parents, who try to help children adjust to many situations. For exampl
children and adolescents sometimes feel lonely or isolated at school, and this feeling can lead
adjustment problems. Now that you know that warm temperatures can positively affe
interpersonal interactions, you can help children not to feel as if they have been left out in th
cold, and also help others feel warmer toward them. A simple action such as turning up the hea
asking children to put on sweaters, or having children share hot chocolate or hot lunches togeth
can help support a positive interpersonal climate.

A young man I know told me that when he was a teenager his parents sent him to
psychologist to try to improve their relationship with him, but he was so uncomfortable in th
doctor's office that he didn't even take off his coat for the first four months. It took him that lon
to warm up even to the psychologist. I myself have gone to a number of parties where I did n
know anybody and felt quite lonely when entering the room. Many other people must have fe
that way, too, as they didn't take off their coats either. Whether you're hosting a meeting or
party, make sure that the room is warm, at least at the beginning of a gathering. Serving war
drinks in a cold season and warm soup as a starter to a dinner might help. Lonely people—
people who are in new, unfamiliar social situations—need psychological warmth as well as physic
warmth.

Temperature, Generosity, and Trust: Warm Your Hands and Open Your Heart

Could temperature affect more than just our opinions and feelings? Could it actually influence o behavior? Could your daily ritual of drinking coffee change the likelihood that you would, sa spare some change for someone who asks for help outside your neighborhood coffee shop? Do your warm morning tea help you start your day with a more open, positive attitude and even he you to trust others more? Williams and Bargh, the researchers at Yale who conducted th experiments with warm cups of coffee, devised a way to find out.[9]

They told participants that they were conducting a consumer marketing study and gave them "new product," a therapeutic pad. Participants were asked to hold the pad—which was either h or cold—for a few moments, then evaluate its effectiveness and indicate whether they wou recommend it to friends, family, and strangers. But the most important part of the study w actually not the survey but the decision participants were asked to make after it. Individuall participants were given a choice between two rewards for participating in the study: a refreshme for themselves or a small gift certificate in the name of a friend they could choose.

The results were dramatic. Among those who held the cold pad, about 75 percent chose reward for themselves and only 25 percent chose a gift for a friend. Of those who handled an reviewed the hot pad, 54 to 46 percent chose a gift for a friend. That is a significant statistic difference in giving behavior. Yet the only factor that was different in the experiment was th temperature of the pad in the participants' hands.

The results of this experiment reinforce the notion that philanthropy and charitable donatio can be more emotional than rational. This is not to say that giving is purely an emotional urg because of course it contains a large rational component. We are not prone to bouts of carele giving or fits of philanthropy, but we do give for many reasons: we may want to be liked an respected by the recipient; we may want to be perceived as generous in our communities; and w may want to feel important and needed. But this experiment, like most embodied cognitio experiments, shows that there is a visceral influence on our actions, even those that we belie come from purely logical thought processes. It also shows that not only is there a significa emotional and subconscious component, but we can be compelled to act by mundane and subt quotidian forces. In this case, the behavior was triggered by the most trivial act (holding therapeutic pad for a few moments).

Williams and Bargh led another investigation into whether holding a warm object wou influence trust as well as generosity.[10] The bedrock of marriages, friendships, and busine relationships, trust can be hard-won and delicate, determined by many factors. Why do we bui certain trusting relationships and not others? The decision to trust someone can be instantaneo and it can feel intuitive, but a little bit of warmth may help forge this important bond.

Researchers asked participants to hold a therapeutic pack that was either cold (59 degrees) hot (105.8 degrees) in another supposed consumer product study. Then they had participan play a game in which some acted as investors and others as trustees. The investor decided ho much money he or she would send to the trustee, who sat anonymously in the other room. Th amount that the investor sent to the trustee was immediately tripled on receipt. Then the trust had to decide how much money he or she returned. In each round of the game, the investo could invest any amount of money from none to one dollar in ten-cent increments. The more th investor invested, the greater the possibility he or she would get back more money, but only if th trustee chose to return it. Although participants believed they were participating in an investi game, they were really engaging in a test of trust. The more an investor trusted the trustee, t more money he or she would invest.

The results of the study were amazing. Those who touched the cold pack just before the gan invested less money compared with those who touched the warm pack. The group with the co pack did not so easily trust the trustees and were not so sure the trustees would return t investment. Holding a hot therapeutic pack, however, prompted people to feel more intimacy an trust others more readily.

The generosity, trust, and intimacy effect of warmth seems to be short-term. Our minds a affected for only a little while by what our bodies feel, but, as I said earlier, what is brief is n necessarily unimportant. A snap judgment can have lasting consequences. The first step towa being able to control and work with these "peas and cues" from our environment—and fro other people—is to become aware of them.

Consider that you might be able to improve a first date—or an initial business meeting—l merely giving your companion a warm drink. You might also consider meeting at a Japanes restaurant that offers warm towels before you eat. Whenever you want another person to percei you as warm or sympathetic, offer him a cup of warm tea or coffee. In negotiations over thin such as salary, sales, or divorce, if you want the other side to compromise or show som generosity, you might offer a nice cup of tea or an espresso, rather than a cold soft drink. Doin so just may tip the scales in your favor.

The Book of Genesis tells the story of Esau and Jacob, sons of the patriarch Isaac. As the eld son, Esau, a rough-mannered hunter, was entitled to the birthright or inheritance. Famished aft a hunt, however, he sold his right to the blessing to Jacob, who was their mother's favorite, exchange for a bowl of stew. When the time came for their aged, blind father to bestow th blessing on Esau, Jacob took his brother's place and, to deceive his father, wore a goatskin on h arms and neck in order to make them appear hairy like Esau's. Isaac could rely only on his sen of touch to read the situation, and remarked, "The voice is the voice of Jacob, but the hands a the hands of Esau," and gave his blessing to Jacob.

This story demonstrates that not only is tactile perception essential for sensing the physic world but it can help us discern what goes on beneath the surface. Like Isaac, when it comes figuring out many situations, we all are feeling our way around. The story also warns agair depending too much on limited and contradictory sensory input in making an importa judgment. It reminds us to question what our senses tell us when we're getting mixed message not to rely on assumptions or faith alone but to use our heads. And of course it also cautions about putting more importance on an immediate, fleeting gratification, like a meal, than on th future satisfaction we would derive from a greater purpose or accomplishment, as Esau did whe he allowed his stomach's physical desire to usurp his inheritance. "Oh, what a tangled web w weave, when first we practice to deceive," wrote Walter Scott. Beware of entangling yourself complicated situations. By relying on what your senses tell you, you may actually be deceivir yourself.

Our senses provide important information, vital to our survival, but we need to be conscious the mixed messages they can convey and evaluate them with discernment.

Stories as well as metaphors alert us to the traps our senses can lay for us. Jacob was able to u embodied cognition to his advantage; Isaac surrendered his reason to his senses for a brief b crucial moment and changed the course of biblical history. Discerning the truth of a situation ar of another person's motives (whether that person is aware of them or not) can be a challeng The "truth" is what we think we perceive through our senses and run through our minds, bo consciously and unconsciously. Our verbal expressions represent our thoughts. *Rough da softhearted, smooth sailing, a hard time, a soft landing, a hard bargainer, rough manners*—all the metaphors involve tactile sensations and perceptions. But are these just random flourishes in ou language, or does their existence connect to something deep in our nature?

The answer, it turns out, is skin-deep—and deeper. The human body's largest, most sensitiv organ is the skin. It covers us entirely, from the delicate fingertips of a jazz pianist to th hardened soles of a fire walker. We want to "stay in touch" with our loved ones, which usual means to stay in communication rather than in literal physical touch. The Gospel of Mark sa that for Jesus to touch a person spiritually, that person must be willing to reach out and touc Jesus. Why is it not enough simply to see and hear Jesus to be affected by him? Of cour generations who have come after Jesus lived have been touched through his words, but to the fir followers the embodiment of his spirit in his person and the ability to touch and be touched b the spirit made flesh were compelling. To this day, we use touch-related words so often i language because touch is the most intimate way to experience and connect with the world.

Scientists have theorized that we used nonverbal communication, including touch, long befo
we used language. We begin progressing from nonverbal to verbal communication as soon as w
are born. Through the touch of their parents and caregivers—hugs and kisses, nursing ar
holding—infants learn about the world around them. Psychologists have demonstrated th
importance of touch in child development. Touch enhances feelings of security in children ar
improves their social skills. In famous, tragic cases of children who grew up in orphanages
Romania with hardly any human contact, the lack of touch stunted their emotional, social, ar
cognitive development.[1]

Touch also influences adults' behavior, such as compliance, altruism, and risk taking. In or
study salespeople in a supermarket approached shoppers and asked them to taste a new snac
While making the request they touched some of the shoppers lightly on the upper arm. Th
touch increased shoppers' willingness to try a sample and even to buy the snack.[2] A recent stud
found that a light tap on the shoulder increased financial risk taking in people, probably due to
resulting sense of enhanced security.[3] Another study found that waitresses who touched custome
on the hand or on the shoulder for about a second received greater tips.[4] Yet the same brief touc
did not influence customers' ratings of the waitresses or their ratings of the atmosphere of th
restaurant; this suggests that the customers were not aware of the effect of the touch on the
behavior.

Touching another human being increases trust and cooperation. It reduces our perception
threat, increases our sense of security, and relaxes us. Anxious people benefit from touchin
someone or holding hands. When people go to the doctor to have a potentially painful procedur
a light touch on the head or shoulders by a health-care provider can reduce their anxiety.
massage after a hard day at work helps me relax, even if my muscles are not particularly tense ar
I am not especially anxious.

The need to be touched has led scientists to try to design and create products that mimic th
feeling of human touch. The "hug shirt," for instance, communicates the sensation of touch f
people who are physically separated: it is made of soft, pleasant-feeling materials and h
sophisticated pressure sensors that are activated by various technologies such as mobile phon
applications.[5] It even stimulates the emotional reactions that follow a hug, such as a decrease
heart rate. Another invention uses a doll that transmits a hugging sensation to a child wearing
special "cyberpajama."[6] People are willing to spend time and money to "stay in touch" wi
technological innovations as well as with the old-fashioned long embrace after being apart.

* * *

Our tactile sensations are not limited to human touch. We experience tactile sensations all th
time, often without even noticing them. We sense softness, hardness, roughness, and smoothne
from wearing clothes and holding books, bags, computers, smartphones, and iPads. We sense th
cushions, pillows, and chairs are hard or soft at home, in the office, and in restaurants. We l
down at the end of the day on a bed whose softness or hardness we've chosen. We dry ourselv
with our fluffy or rough towels, and at Pilates and yoga classes we exercise on thin or cushion
mats.

We also use tactile descriptions metaphorically. For example, *rough* describes a difficu
unpleasant situation or stretch of time, as the corresponding physical touch of a rough object ca
be uneven or harsh. We use the word *soft* when we describe someone who is easy to get alon
with or who can be easily molded, like a soft, yielding substance. In contrast, *hard* is used

describe a rigid, difficult person who, like an unyielding material, cannot readily be changed.

Metaphors represent a deeper connection between our physical sensations and our behavio and judgments. Several researchers examined whether metaphors such as *hard* and *so* negotiations are not just a matter of speech and whether the texture of the objects we mig touch influences our behavior. Can a hard or soft chair influence how rigidly or flexibly w behave? Should we be careful where we sit when we have a difficult negotiation? We'll explo these questions throughout this chapter.

Hard People with Soft Spots

On every vacation, I go to San Diego to visit my daughter and granddaughters. I love spendi time with them, listening to their stories, and telling them my own. During the day, when th children are at school, I love to be outside in the fresh air, and I make a habit of walking alon the beach. San Diego's weather is beautiful, and you can walk for many miles on those gorgeou beaches. Usually, I walk with a good friend for about an hour and a half and then sit in one of th cafés along the beach.

There are two ways to walk along the beach: on the sand or on the boardwalk. The two rout are next to each other, but only the boardwalk is hard: it is made of wooden boards. My frien and I have no real preference, so sometimes we walk on the sand and sometimes we walk on th boardwalk.

I have noticed for quite some time that my friend can be very rigid on certain days, whereas o other days she can be much more flexible. Sometimes she does not mind what café we sit i whereas at other times she insists that we stick to our original plan exactly. I always thought th was because she is moody, and I believed that she had bad days and good days. Recentl however, I noticed that she is more rigid on the days when we walk on the boardwalk than o those when we walk on the sand. Is it possible that the soft or hard tactile sensation on our fe softens or hardens my friend's behavior?

A group of researchers from Harvard, Yale, and MIT investigated this very question b conducting several experiments.[7] In the first experiment they devised a creative way to make the participants touch a soft or a hard object. They asked passersby to watch and participate in magic show. You probably remember that before a magician performs certain tricks, such turning a handkerchief into doves or making money come out of a box, he often asks a memb of the audience to touch the object to ascertain that there is nothing funny going on. So th researchers asked the passersby to examine the object the magician was going to use. Half of th participants were asked to examine a hard block of wood and the other half a soft blanket. The researchers told the participants that the magic show had been postponed and gave them anoth ostensibly unrelated task.

They were asked to read a passage describing an ambiguous interaction between an employe and a boss. The participants were asked to rate several traits of the employee, some of which we related to rigidity and strictness. Those who had touched the soft blanket judged the employee t be less rigid and less strict (in other words, softer) than those who had touched the hard bloc Yet all participants had been given the same scene to read. Participants from both groups rated a the other traits, such as outgoingness and seriousness, the same; they differed only on the trai related to strictness and rigidity.

The researchers wanted to find out whether the tactile sensation of hardness or softness wou influence not only perception and judgment but also real behavior—the kind exhibited during negotiation or bargaining session. A soft bargainer sees the other negotiators as friends and see agreement even if it's necessary to compromise. That person will more easily modify his or h initial position in order to reach an agreement. In contrast, a hard bargainer sees the oth negotiators as opponents. He or she usually does not trust them and does not want to change h or her initial position by making compromises.

The researchers examined how tactile sensations related to softness and hardness can influen how soft or hard we are in our bargaining. In this study the researchers did not ask th participants to hold a soft or a hard object but asked them to sit on either a wooden chair or soft chair and to imagine they were at a car dealership, wanting to buy a certain car. Participan were asked to make two offers, assuming that the first offer was not accepted. Those who sat on soft chair changed their initial offer more than did those who had sat on a hard chair. The so seats made softer negotiators.

Softness and hardness are attributed not only to people and behaviors but also to som categories—gender identity, for example. Though gender roles have changed considerably, certai traits are still stereotypically attributed to men and women. One of these is softness. Much as w may dislike this prejudice, the fact is that women are perceived as being softer than men, and me as tougher than women.

A group of researchers conducted two studies to investigate whether our minds correlate a so or hard physical sensation with female or male characteristics.[8] In the first study, participants we presented with eight sexually ambiguous faces on a computer screen and asked to indica whether they were male or female. They were also asked to squeeze a ball during the task, becau the experiment was supposedly examining the influence of performing a task on face perceptio Participants were divided into two groups, one of which was given a soft ball and the other harder ball. Those who squeezed the hard ball were more likely to categorize the ambiguous fac as male. In other words, the tactile sensation of softness or hardness influenced whether th participants perceived a person as male or female.

In the second study, participants were asked again to categorize faces as male or female. Th time the faces were presented not on the computer screen but on paper, on which the participan were to write their answers with a pen. Participants in one group were told to press the pen ha since there was carbon paper underneath and the researchers needed two copies. Those in th other group were asked to press gently and not damage the carbon paper underneath. Researche found again that those who pressed the pen hard categorized faces as males more often than d those who pressed the pen gently.

So soft-hard tactile sensation influences categorization of male and female identity. Might w find similar results regarding other categories that are stereotypically associated with soft and hard Several researchers examined this question with two social categories: academic disciplines an political affiliation.

Academic disciplines are categorized as hard and soft. The natural and physical sciences a colloquially called "hard sciences," whereas the social sciences are "soft sciences." I don't like th dichotomy, especially since psychology is often considered a social or soft science even though w psychologists run controlled experiments and measure quantitatively just as life or physic scientists do.

In the political arena, in the United States, Republicans generally have more hard-line views o

the economy and foreign relations as well as on social issues such as abortion or same-sex marriag and are regarded as harder than Democrats, who are perceived by most Americans as softer an more compassionate and empathetic.[9]

In one study researchers examined whether tactile sensations of softness or hardness wou influence participants' identification of people as Democrats or Republicans or as physicists (ha science) or historians (soft science).[10] In one experiment, they showed participants photos of fo male and four female faces and asked them to guess each one's political affiliation while squeezin either a soft ball or a hard ball. The results were similar to the findings regarding the perceive gender of faces: those who squeezed a soft ball identified more faces as Democrats.

In the next experiment, participants were presented with photos of professors and asked identify them as physicists or historians. Compared with those who squeezed a soft ba participants who squeezed a hard ball classified more faces as those of physicists.

These findings suggest that soft or hard sensations do influence our categorization process. Th tactile sensations of softness and hardness activate the psychological concepts of soft and har These physical sensations influenced how people perceived an interaction as soft or hard, and ho they categorized individuals. The sensations affected people's actual behavior.

Take the Rough with the Smooth

One day my three-year-old granddaughter, Natalie, noticed that her father was in a bad mood Now, moods are very complicated things (if they can even be called "things"). There a researchers who spend their entire careers studying moods, but as a "child psychologist," Natal had an instant explanation for her daddy's doldrums—he was angry since he had hair on his fac She was referring to his stubble from not shaving, but I thought this was so adorable, in the wa that children's ideas often are. Of course he would be upset, with his face feeling rough, Natal thought.

In many languages, we associate roughness with difficulty, frustration, and pain, and th association could indicate a deeper, embodied connection of sensation to word.

When I was a young soldier in the air force, my unit worked in shifts. The night shift was fro 7:00 p.m. to 8:00 a.m. the next day, when we returned home and had a free day and night; the we went back to the barracks the next morning. The night shifts were convenient for me and m class schedule at the university, but even so, I hated them. At night, we were divided into tw groups, and each group was given four hours of sleep in a small room. I distinctly remember th blankets and sheets on the beds as very rough. At a certain point we realized that we could brin our own towels, pillowcases, and sheets, which made our sleep more comfortable and pleasant. started thinking that the shifts were not so bad and enjoyed the time I spent on them with m friends much more. The atmosphere became smoother; we worked in harmony with far few arguments and conflicts. We all had realized that it was more pleasant to sleep on smooth rath than rough sheets and blankets, but we hadn't thought the change would improve our wakin lives as well. Now, many years later, I believe that the tactile sensations of roughness an smoothness influenced our behavior and interactions. We had slept not on the wrong *side* of th bed but on the wrong *sheets* on the bed.

A group of researchers investigated whether touching a smooth or rough object wou influence participants' perceptions of a personal interaction as rough or smooth.[11] To prime th

sensation of rough or smooth, the experimenters gave participants jigsaw puzzles to complet telling them this was a cognitive test. Half of the participants received puzzles with gloss smooth pieces, while the other half received pieces that were covered in coarse-grained sandpape After working with the puzzles, they were asked to participate in another study, which w ostensibly different from the "cognitive" test. Participants read a transcript of an interactio between two people that was deliberately ambiguous, somewhere between a friendly conversatio and an argument. They then had to indicate whether the interaction was friendly or unfriendl competitive or cooperative, a discussion or an argument.

The students who had handled the sandpaper puzzles judged the interaction to be mo competitive, unfriendly, and argumentative compared with the smooth-puzzlers, who found th interaction friendlier and noncompetitive. Although all participants read the same transcrip merely touching a rough or a smooth object influenced their perceptions of the interaction smooth or rough. There was no difference between the two groups in their evaluations of ho familiar the people they'd read about were with one another. Only aspects relating to rough smooth were skewed after the participants had been primed by the jigsaw puzzles.

Why Texture Matters: The Scaffolding of Experience

Without our awareness, the textures of the various objects we constantly touch influence o judgments, perceptions, and behavior. Touching rough, smooth, hard, or soft objects influenc how rough or smooth, hard or soft we perceive a situation to be and how hard or soft o behavior is. As incredible as these results sound, they are logical from the point of view embodied cognition. They suggest that metaphors and abstract conceptualizations are related an grounded in our bodily experiences. That is, the physical sensations of texture are the buildin blocks of the abstract concepts with the same names. The concept of a rough relationship, f instance, is built on the experience of rough texture, which is learned very early in life.

A building, even the tallest one, starts with a foundation, and is built, layer by layer, floor upo floor upon floor, upon this foundation. Similarly, through the process of scaffolding, childre develop meaning for these concepts in direct relation to their physical underpinnings. Childre learn concepts through physical sensations. They learn that some tactile sensations are soft, lik their mothers' touch and their teddy bears' fur. They learn that a doctor's examining table is har and the experience there, perhaps receiving a shot, is rough. These sensations become the scaffo upon which the abstract concepts are built. It is almost as if they create a mental file under th same name—"smoothness"—in which every emotional experience is included with corresponding physical experience. When we become adults, tactile sensations all evoke emotio that are related to these early sensory experiences, and thus influence our behavior, emotions, an judgments. Our minds read the old file, and we act accordingly.

Abstract concepts may become grounded in our sensory-motor experiences when physic sensations activate specific areas in the brain. If physical sensations are in fact the building bloc of abstract knowledge and metaphorical expressions are born from sensory-motor inspiration, the the same brain regions that are activated during the tactile physical sensation (rough-smoot hard-soft) will be activated when we use the corresponding metaphors (*rough relationships, ha day*). On the other hand, if abstract concepts are not grounded in our sensory experiences an metaphors are just random flourishes of speech, then different areas of the brain will be activate