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First Chapter

‘The Female Brain’

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Leila was a busy little bee, flitting around the playground, connecting with the other children whether or not she knew them. On the verge of speaking in two- and three-word phrases, she mostly used her contagious smile and emphatic nods of her head to communicate, and communicate she did. So did the other little girls. "Dolly," said one. "Shopping," said another. There was a pint-size community forming, abuzz with chatter, games, and imaginary families.

Leila was always happy to see her cousin Joseph when he joined her on the playground, but her joy never lasted long. Joseph grabbed the blocks she and her friends were using to make a house. He wanted to build a rocket, and build it by himself. His pals would wreck anything that Leila and her friends had created. The boys pushed the girls around, refused to take turns, and would ignore a girl's request to stop or give the toy back. By the end of the morning, Leila had retreated to the other end of the play area with the girls. They wanted to play house quietly together.

Common sense tells us that boys and girls behave differently. We see it every day at home, on the playground, and in classrooms. But what the culture hasn't told us is that the brain dictates these divergent behaviors. The impulses of children are so innate that they kick in even if we adults try to nudge them in another direction. One of my patients gave her three-and-a-half-year-old daughter many unisex toys, including a bright red fire truck instead of a doll. She walked into her daughter's room one afternoon to find her cuddling the truck in a baby blanket, rocking it back and forth saying, "Don't worry, little truckie, everything will be all right."

This isn't socialization. This little girl didn't cuddle her "truckie" because her environment molded her unisex brain. There is no unisex brain. She was born with a female brain, which came complete with its own impulses. Girls arrive already wired as girls, and boys arrive already wired as boys. Their brains are different by the time they're born, and their brains are what drive their impulses, values, and their very reality.

The brain shapes the way we see, hear, smell, and taste. Nerves run from our sense organs directly to the brain, and the brain does all the interpreting. A good conk on the head in the right place can mean that you won't be able to smell or taste. But the brain does more than that. It profoundly affects how we conceptualize the world-whether we

think a person is good or bad, if we like the weather today or it makes us unhappy, or whether we're inclined to take care of the day's business. You don't have to be a neuroscientist to know this. If you're feeling a little down and have a nice glass of wine or a lovely piece of chocolate, your attitude can shift. A gray, cloudy day can turn bright, or irritation with a loved one can evaporate because of the way the chemicals in those substances affect the brain. Your immediate reality can change in an instant.

f chemicals acting on the brain can create different realities, what happens when two brains have different structures? There's no question that their realities will be different. Brain damage, strokes, prefrontal lobotomies, and head injuries can change what's important to a person. They can even change one's personality from aggressive to meek or from kind to grumpy.

But it's not as if we all start out with the same brain structure. Males' and females' brains are different by nature. Think about this. What if the communication center is bigger in one brain than in the other? What if the emotional memory center is bigger in one than in the other? What if one brain develops a greater ability to read cues in people than does the other? In this case, you would have a person whose reality dictated that communication, connection, emotional sensitivity, and responsiveness were the primary values. This person would prize these qualities above all others and be baffled by a person with a brain that didn't grasp the importance of these qualities. In essence, you would have someone with a female brain.

We, meaning doctors and scientists, used to think that gender was culturally created for humans but not for animals. When I was in medical school in the 1970s and '80s, it had already been discovered that male and female animal brains started developing differently in utero, suggesting that impulses such as mating and bearing and rearing young are hardwired into the animal brain. But we were taught that for humans sex differences mostly came from how one's parents raised one as a boy or a girl. Now we know that's not completely true, and if we go back to where it all started, the picture becomes abundantly clear.
Imagine for a moment that you are in a microcapsule speeding up the vaginal canal, hitting warp drive through the cervix ahead of the tsunami of sperm. Once inside the uterus, you'll see a giant, undulating egg waiting for that lucky tadpole with enough moxie to penetrate the surface. Let's say the sperm that led the charge carries an X and not a Y chromosome. Voil,, the fertilized egg is a girl.

In the span of just thirty-eight weeks, we would see this girl grow from a group of cells that could fit on the head of a pin to an infant who weighs an average of seven and a half pounds and possesses the machinery she needs to live outside her mother's body. But the majority of the brain development that determines her sex-specific circuits happens during the first eighteen weeks of pregnancy.

Until eight weeks old, every fetal brain looks female-female is nature's default gender setting. If you were to watch a female and a male brain developing via time-lapse photography, you would see their circuit diagrams being laid down according to the

blueprint drafted by both genes and sex hormones. A huge testosterone surge beginning in the eighth week will turn this unisex brain male by killing off some cells in the communication centers and growing more cells in the sex and aggression centers. If the testosterone surge doesn't happen, the female brain continues to grow unperturbed. The fetal girl's brain cells sprout more connections in the communication centers and areas that process emotion. How does this fetal fork in the road affect us? For one thing, because of her larger communication center, this girl will grow up to be more talkative than her brother. Men use about seven thousand words per day. Women use about twenty thousand. For another, it defines our innate biological destiny, coloring the lens through which each of us views and engages the world.

Reading Emotion Means Reading Reality

Just about the first thing the female brain compels a baby to do is study faces. Cara, a former student of mine, brought her baby Leila in to see us for regular visits. We loved watching how Leila changed as she grew up, and we saw her pretty much from birth through kindergarten. At a few weeks old, Leila was studying every face that appeared in front of her. My staff and I made plenty of eye contact, and soon she was smiling back at us. We mirrored each other's faces and sounds, and it was fun bonding with her. I wanted to take her home with me, particularly because I hadn't had the same experience with my son.

I loved that this baby girl wanted to look at me, and I wished my son had been so interested in my face. He was just the opposite. He wanted to look at everything else-mobiles, lights, and doorknobs-but not me. Making eye contact was at the bottom of his list of interesting things to do. I was taught in medical school that all babies are born with the need for mutual gazing because it is the key to developing the mother-infant bond, and for months I thought something was terribly wrong with my son. They didn't know back then about the many sex-specific differences in the brain. All babies were thought to be hardwired to gaze at faces, but it turns out that theories of the earliest stages of child development were female-biased. Girls, not boys, come out wired for mutual gazing. Girls do not experience the testosterone surge in utero that shrinks the centers for communication, observation, and processing of emotion, so their potential to develop skills in these areas are better at birth than boys'. Over the first three months of life, a baby girl's skills in eye contact and mutual facial gazing will increase by over 400 percent, whereas facial gazing skills in a boy during this time will not increase at all.

Baby girls are born interested in emotional expression. They take meaning about themselves from a look, a touch, every reaction from the people they come into contact with. From these cues they discover whether they are worthy, lovable, or annoying. But take away the signposts that an expressive face provides and you've taken away the female brain's main touchstone for reality. Watch a little girl as she approaches a mime. She'll try with everything she has to elicit an expression. Little girls do not tolerate flat faces. They interpret an emotionless face that's turned toward them as a signal they are not doing something right. Like dogs chasing Frisbees, little girls will go after the face until they get a response. The girls will think that if they do it just right, they'll get the

reaction they expect. It's the same kind of instinct that keeps a grown woman going after a narcissistic or otherwise emotionally unavailable man-"if I just do it right, he'll love me." You can imagine, then, the negative impact on a little girl's developing sense of self of the unresponsive, flat face of a depressed mother-or even one that's had too many Botox injections. The lack of facial expression is very confusing to a girl, and she may come to believe, because she can't get the expected reaction to a plea for attention or a gesture of affection, that her mother doesn't really like her. She will eventually turn her efforts to faces that are more responsive.

Anyone who has raised boys and girls or watched them grow up can see that they develop differently, especially that baby girls will connect emotionally in ways that baby boys don't. But psychoanalytic theory misrepresented this sex difference and made the assumption that greater facial gazing and the impulse to connect meant that girls were more "needy" of symbiosis with their mothers. The greater facial gazing doesn't indicate a need; it indicates an innate skill in observation. It's a skill that comes with a brain that is more mature at birth than a boy's brain and develops faster, by one to two years.

Hearing, Approval and Being Heard

Girls' well-developed brain circuits for gathering meaning from faces and tone of voice also push them to comprehend the social approval of others very early. Cara was surprised that she was able to take Leila out into public. "It's amazing. We can sit at a restaurant, and Leila knows, at eighteen months, that if I raise my hand she should stop reaching for my glass of wine. And I noticed that if her dad and I are arguing, she'll eat with her fingers until one of us looks over at her. Then she'll go back to struggling with a fork."

These brief interactions show Leila picking up cues from her parents' faces that her cousin Joseph likely wouldn't have looked for. A University of Texas study of twelve-month-old girls and boys showed the difference in desire and ability to observe. In this case, the child and mother were brought into a room, left alone together, and instructed not to touch an object. The mother stood off to the side. Every move, glance, and utterance was videotaped. Very few of the girls touched the forbidden object, even though their mothers never explicitly told them not to. The girls looked back at their mothers' faces ten to twenty times more than did the boys, checking for signs of approval or disapproval. The boys, by contrast, moved around the room and rarely glanced at their mothers' faces. They frequently touched the forbidden object, even though their mothers shouted, "No!" The one-year-old boys, driven by their testosterone-formed male brains, are compelled to investigate their environment, even those elements of it they are forbidden to touch.

Because their brains did not undergo a testosterone marination in utero and their communication and emotion centers were left intact, girls also arrive in the world better at reading faces and hearing human vocal tones. Just as bats can hear sounds that even cats and dogs cannot, girls can hear a broader range of sound frequency and tones in the human voice than can boys. Even as an infant, all a girl needs to hear is a slight

tightening in her mother's voice to know she should not be opening the drawer with the fancy wrapping paper in it. But you will have to restrain the boy physically to keep him from destroying next Christmas's packages. It's not that he's ignoring his mother. He physically cannot hear the same tone of warning.

A girl is also astute at reading from facial expression whether or not she's being listened to. At eighteen months, Leila could not be kept quiet. We couldn't understand anything she was trying to tell us, but she waddled up to each person in the office and unloosed a stream of words that seemed very important to her. She tested for agreement in each of us. If we appeared even the tiniest bit disinterested, or broke eye contact for a second, she put her hands on her hips, stomped her foot, and grunted in indignation. "Listen!" she yelled. No eye contact meant to her that we were not listening. Cara and her husband, Charles, were worried that Leila seemed to insist on being included in any conversation at home. She was so demanding that they thought they had spoiled her. But they hadn't. It was just their daughter's brain searching for a way to validate her sense of self.

Whether or not she is being listened to will tell a young girl if others take her seriously, which in turn goes to the growth of her sense of a successful self. Even though her language skills aren't developed, she understands more than she expresses, and she knows-before you do-if your mind has wandered for an instant. She can tell if the adult understands her. If the adult gets on the same wavelength, it actually creates her sense of self as being successful or important. If she doesn't connect, her sense is of an unsuccessful self. Charles in particular was surprised by how much focus it took to keep up the relationship with his daughter. But he saw that, when he listened attentively, she began to develop more confidence. . . .