They prefer a system that cannot measure what it promises to measure.

"I guess they've gone to their focus groups, and the focus groups have said, 'No, it's not a hit.' They don't want to put money into something that doesn't test well," Kenna says. "But that's not the way this music works. This music takes faith. And faith isn't what the music business is about anymore. It's absolutely frustrating, and it's overwhelming as well. I can't sleep. My mind is running. But if nothing else, I get to play, and the response from the kids is so massive and beautiful that it makes me get up the next day and fight again. The kids come up to me after the show and say, 'It sucks what the record companies are doing to you. But we're here for you, and we're telling everybody.'"

SIX

# *Seven Seconds in the Bronx: The Delicate Art of Mind Reading*

The 1100 block of Wheeler Avenue in the Soundview neighborhood of the South Bronx is a narrow street of modest two-story houses and apartments. At one end is the bustle of Westchester Avenue, the neighborhood's main commercial strip, and from there, the block runs about two hundred yards, flanked by trees and twin rows of parked cars. The buildings were built in the early part of the last century. Many have an ornate façade of red brick, with four- or five-step stoops leading to the front door. It is a poor and working-class neighborhood, and in the late 1990s, the drug trade in the area, particularly on Westchester Avenue and one street over on Elder Avenue, was brisk. Soundview is just the kind of place where you would go if you were an immigrant in New York City who was looking to live somewhere cheap and close to a subway, which is why Amadou Diallo made his way to Wheeler Avenue.

Diallo was from Guinea. In 1999, he was twenty-two and working as a peddler in lower Manhattan, selling videotapes and socks and gloves from the sidewalk along Fourteenth Street. He was short and unassuming, about five foot six and 150 pounds, and he lived at 1157 Wheeler, on the second floor of one of the street's narrow apartment houses. On the night of February 3, 1999, Diallo returned home to his apartment just before midnight, talked to his roommates, and then went downstairs and stood at the top of the steps to his building, taking in the night. A few minutes later, a group of plainclothes police officers turned slowly onto Wheeler Avenue in an unmarked Ford Taurus. There were four of them — all white, all wearing jeans and sweatshirts and baseball caps and bulletproof vests, and all carrying police-issue 9-millimeter semiautomatic handguns. They were part of what is called the Street Crime Unit, a special division of the New York Police Department, dedicated to patrolling crime "hot spots" in the city's poorest neighborhoods. Driving the Taurus was Ken Boss. He was twenty-seven. Next to him was Sean Carroll, thirty-five, and in the backseat were Edward McMellon, twenty-six, and Richard Murphy, twenty-six.

It was Carroll who spotted Diallo first. "Hold up, hold up," he said to the others in the car. "What's that guy doing there?" Carroll claimed later that he had had two thoughts. One was that Diallo might be the lookout for a "push-in" robber — that is, a burglar who pretends to be a visitor and pushes his way into people's apartments. The other was that Diallo fitted the description of a serial rapist who had been active in the neighborhood about a year earlier. "He was just standing there," Carroll recalled.



"He was just standing on the stoop, looking up and down the block, peeking his head out and then putting his head back against the wall. Within seconds, he does the same thing, looks down, looks right. And it appeared that he stepped backwards into the vestibule as we were approaching, like he didn't want to be seen. And then we passed by, and I am looking at him, and I'm trying to figure out what's going on. What's this guy up to?"

Boss stopped the car and backed up until the Taurus was right in front of 1157 Wheeler. Diallo was still there, which Carroll would later say "amazed" him. "I'm like, all right, definitely something is going on here." Carroll and McMellon got out of the car. "Police," McMellon called out, holding up his badge. "Can we have a word?" Diallo didn't answer. Later, it emerged that Diallo had a stutter, so he may well have tried to say something but simply couldn't. What's more, his English wasn't perfect, and it was rumored as well that someone he knew had recently been robbed by a group of armed men, so he must have been terrified: here he was, outside in a bad neighborhood after midnight with two very large men in baseball caps, their chests inflated by their bulletproof vests, striding toward him. Diallo paused and then ran into the vestibule. Carroll and McMellon gave chase. Diallo reached the inside door and grabbed the doorknob with his left hand while, as the officers would later testify, turning his body sideways and "digging" into his pocket with his other hand. "Show me your hands!" Carroll called out. McMellon was yelling, too: "Get your hands out of your pockets. Don't make me fucking kill you!" But Diallo was growing more and more agitated, and Carroll was starting

to get nervous, too, because it seemed to him that the reason Diallo was turning his body sideways was that he wanted to hide whatever he was doing with his right hand.

"We were probably at the top steps of the vestibule, trying to get to him before he got through that door," Carroll remembered. "The individual turned, looked at us. His hand was on — still on the doorknob. And he starts removing a black object from his right side. And as he pulled the object, all I could see was a top — it looked like the slide of a black gun. My prior experience and training, my prior arrests, dictated to me that this person was pulling a gun."

Carroll yelled out, "Gun! He's got a gun!"

Diallo didn't stop. He continued pulling on something in his pocket, and now he began to raise the black object in the direction of the officers. Carroll opened fire. McMellon instinctively jumped backward off the step and landed on his backside, firing as he flew through the air. As his bullets ricocheted around the vestibule, Carroll assumed that they came from Diallo's gun, and when he saw McMellon flying backward, he assumed that McMellon had been shot by Diallo, so he kept shooting, aiming, as police are taught to do, for "center mass." There were pieces of cement and splinters of wood flying in every direction, and the air was electric with the flash of gun muzzles and the sparks from the bullets.

Boss and Murphy were now out of the car as well, running toward the building. "I saw Ed McMellon," Boss would later testify, when the four officers were brought to trial on charges of first-degree manslaughter and second-degree murder. "He was on the left side of the vestibule and



just came flying off that step all the way down. And at the same time, Sean Carroll is on the right-hand side, and he is coming down the stairs. It was frantic. He was running down the stairs, and it was just — it was intense. He was just doing whatever he could to retreat off those stairs. And Ed was on the ground. Shots are still going off. I'm running. I'm moving. And Ed was shot. That's all I could see. Ed was firing his weapon. Sean was firing his weapon into the vestibule. . . . And then I see Mr. Diallo. He is in the rear of the vestibule, in the back, towards the back wall, where that inner door is. He is a little bit off to the side of that door and he is crouched. He is crouched and he has his hand out and I see a gun. And I said, 'My God, I'm going to die.' I fired my weapon. I fired it as I was pushing myself backward and then I jumped off to the left. I was out of the line of fire. . . . His knees were bent. His back was straight up. And what it looked like was somebody trying to make a smaller target. It looked like a combat stance, the same one that I was taught in the police academy."

At that point, the attorney questioning Boss interrupted: "And how was his hand?"

"It was out."

"Straight out?"

"Straight out."

"And in his hand you saw an object. Is that correct?"

"Yeah, I thought I saw a gun in his hand. . . . What I seen was an entire weapon. A square weapon in his hand. It looked to me at that split second, after all the gunshots around me and the gun smoke and Ed McMellon down, that he was holding a gun and that he had just shot Ed and that I was next."

Carroll and McMellon fired sixteen shots each: an entire clip. Boss fired five shots. Murphy fired four shots. There was silence. Guns drawn, they climbed the stairs and approached Diallo. "I seen his right hand," Boss said later. "It was out from his body. His palm was open. And where there should have been a gun, there was a wallet. . . . I said, 'Where's the fucking gun?'"

Boss ran up the street toward Westchester Avenue because he had lost track in the shouting and the shooting of where they were. Later, when the ambulances arrived, he was so distraught, he could not speak.

Carroll sat down on the steps, next to Diallo's bullet-ridden body, and started to cry.

## 1. *Three Fatal Mistakes*

Perhaps the most common — and the most important — forms of rapid cognition are the judgments we make and the impressions we form of other people. Every waking minute that we are in the presence of someone, we come up with a constant stream of predictions and inferences about what that person is thinking and feeling. When someone says, "I love you," we look into that person's eyes to judge his or her sincerity. When we meet someone new, we often pick up on subtle signals, so that afterward, even though he or she may have talked in a normal and friendly manner, we may say, "I don't think he liked me," or "I don't think she's very happy." We easily parse complex distinctions in facial expression. If you were to see me grinning, for example, with my eyes twinkling, you'd say I was amused. But if you were to see me nod and smile



exaggeratedly, with the corners of my lips tightened, you would take it that I had been teased and was responding sarcastically. If I were to make eye contact with someone, give a small smile, and then look down and avert my gaze, you would think I was flirting. If I were to follow a remark with a quick smile and then nod or tilt my head sideways, you might conclude that I had just said something a little harsh and wanted to take the edge off it. You wouldn't need to hear anything I was saying in order to reach these conclusions. They would just come to you, *blink*. If you were to approach a one-year-old child who sits playing on the floor and do something a little bit puzzling, such as cupping your hands over hers, the child would immediately look up into your eyes. Why? Because what you have done requires explanation, and the child knows that she can find an answer on your face. This practice of inferring the motivations and intentions of others is classic thin-slicing. It is picking up on subtle, fleeting cues in order to read someone's mind — and there is almost no other impulse so basic and so automatic and at which, most of the time, we so effortlessly excel. In the early hours of February 4, 1999, however, the four officers cruising down Wheeler Avenue failed at this most fundamental task. They did not read Diallo's mind.

First, Sean Carroll saw Diallo and said to the others in the car, "What's that guy doing there?" The answer was that Diallo was getting some air. But Carroll sized him up and in that instant decided he looked suspicious. That was mistake number one. Then they backed the car up, and Diallo didn't move. Carroll later said that "amazed" him: *How brazen was this man, who didn't run at the sight of*

*the police?* Diallo wasn't brazen. He was curious. That was mistake number two. Then Carroll and Murphy stepped toward Diallo on the stoop and watched him turn slightly to the side, and make a movement for his pocket. In that split second, they decided he was dangerous. But he was not. He was terrified. That was mistake number three. Ordinarily, we have no difficulty at all distinguishing, in a blink, between someone who is suspicious and someone who is not, between someone brazen and someone curious, and, most easily of all, between someone terrified and someone dangerous; anyone who walks down a city street late at night makes those kinds of instantaneous calculations constantly. Yet, for some reason, that most basic human ability deserted those officers that night. Why?

These kinds of mistakes were not anomalous events. Mind-reading failures happen to all of us. They lie at the root of countless arguments, disagreements, misunderstandings, and hurt feelings. And yet, because these failures are so instantaneous and so mysterious, we don't really know how to understand them. In the weeks and months that followed the Diallo shooting, for example, as the case made headlines around the world, the argument over what happened that night veered back and forth between two extremes. There were those who said that it was just a horrible accident, an inevitable by-product of the fact that police officers sometimes have to make life-or-death decisions in conditions of uncertainty. That's what the jury in the Diallo trial concluded, and Boss, Carroll, McMellon, and Murphy were all acquitted of murder charges. On the other side were those who saw what happened as an open-and-shut case of racism. There were



protests and demonstrations throughout the city. Diallo was held up as a martyr. Wheeler Avenue was renamed Amadou Diallo Place. Bruce Springsteen wrote and performed a song in his honor called "41 Shots," with the chorus "You can get killed just for living in your American skin."

Neither of these explanations, however, is particularly satisfying. There was no evidence that the four officers in the Diallo case were bad people, or racists, or out to get Diallo. On the other hand, it seems wrong to call the shooting a simple accident, since this wasn't exactly exemplary police work. The officers made a series of critical misjudgments, beginning with the assumption that a man getting a breath of fresh air outside his own home was a potential criminal.

The Diallo shooting, in other words, falls into a kind of gray area, the middle ground between deliberate and accidental. Mind-reading failures are sometimes like that. They aren't always as obvious and spectacular as other breakdowns in rapid cognition. They are subtle and complex and surprisingly common, and what happened on Wheeler Avenue is a powerful example of how mind reading works — and how it sometimes goes terribly awry.

## 2. *The Theory of Mind Reading*

Much of our understanding of mind reading comes from two remarkable scientists, a teacher and his pupil: Silvan Tomkins and Paul Ekman. Tomkins was the teacher. He was born in Philadelphia at the turn of the last century, the son of a dentist from Russia. He was short and thick

around the middle, with a wild mane of white hair and huge black plastic-rimmed glasses. He taught psychology at Princeton and Rutgers and was the author of *Affect, Imagery, Consciousness*, a four-volume work so dense that its readers were evenly divided between those who understood it and thought it was brilliant and those who did not understand it and thought it was brilliant. He was a legendary talker. At the end of a cocktail party, a crowd of people would sit rapt at Tomkins's feet. Someone would say, "One more question!" and everyone would stay for another hour and a half as Tomkins held forth on, say, comic books, a television sitcom, the biology of emotion, his problem with Kant, and his enthusiasm for the latest fad diets — all enfolded into one extended riff.

During the Depression, in the midst of his doctoral studies at Harvard, he worked as a handicapper for a horse-racing syndicate and was so successful that he lived lavishly on Manhattan's Upper East Side. At the track, where he sat in the stands for hours staring at the horses through binoculars, he was known as "the professor." "He had a system for predicting how a horse would do, based on what horse was on either side of him, based on their emotional relationship," Ekman remembers. If a male horse, for instance, had lost to a mare in his first or second year, he would be ruined if he went to the gate with a mare next to him in the lineup. (Or something like that — no one really knew for certain.)

Tomkins believed that faces — even the faces of horses — held valuable clues to inner emotions and motivations. He could walk into a post office, it was said, go over to the Wanted posters, and, just by looking at the



mug shots, say what crimes the various fugitives had committed. "He would watch the show *To Tell the Truth*, and without fail he could always pick out the people who were lying," his son Mark recalls. "He actually wrote the producer at one point to say it was too easy, and the man invited him to come to New York, go backstage, and show his stuff." Virginia Demos, who teaches psychology at Harvard, recalls having long conversations with Tomkins during the 1988 Democratic National Convention. "We would sit and talk on the phone, and he would turn the sound down while, say, Jesse Jackson was talking to Michael Dukakis. And he would read the faces and give his predictions on what would happen. It was profound."

Paul Ekman first encountered Tomkins in the early 1960s. Ekman was then a young psychologist just out of graduate school, and he was interested in studying faces. Was there a common set of rules, he wondered, that governed the facial expressions that human beings made? Silvan Tomkins said that there was. But most psychologists said that there wasn't. The conventional wisdom at the time held that expressions were culturally determined — that is, we simply used our faces according to a set of learned social conventions. Ekman didn't know which view was right, so, to help him decide, he traveled to Japan, Brazil, and Argentina — and even to remote tribes in the jungles of the Far East — carrying photographs of men and women making a variety of distinctive faces. To his amazement, everywhere he went, people agreed on what those expressions meant. Tomkins, he realized, was right.

Not long afterward, Tomkins visited Ekman at his laboratory in San Francisco. Ekman had tracked down a

hundred thousand feet of film that had been shot by the virologist Carleton Gajdusek in the remote jungles of Papua New Guinea. Some of the footage was of a tribe called the South Fore, who were a peaceful and friendly people. The rest was of the Kukukuku, a hostile and murderous tribe with a homosexual ritual in which preadolescent boys were required to serve as courtesans for the male elders of the tribe. For six months, Ekman and his collaborator, Wallace Friesen, had been sorting through the footage, cutting extraneous scenes, focusing just on close-ups of the faces of the tribesmen in order to compare the facial expressions of the two groups.

As Ekman set up the projector, Tomkins waited in the back. He had been told nothing about the tribes involved; all identifying context had been edited out. Tomkins looked on intently, peering through his glasses. At the end of the film, he approached the screen and pointed to the faces of the South Fore. "These are a sweet, gentle people, very indulgent, very peaceful," he said. Then he pointed to the faces of the Kukukuku. "This other group is violent, and there is lots of evidence to suggest homosexuality." Even today, a third of a century later, Ekman cannot get over what Tomkins did. "My God! I vividly remember saying, 'Silvan, how on earth are you doing that?'" Ekman recalls. "And he went up to the screen, and, while we played the film backward in slow motion, he pointed out the particular bulges and wrinkles in the faces that he was using to make his judgment. That's when I realized, 'I've got to unpack the face.' It was a gold mine of information that everyone had ignored. This guy could see it, and if he could see it, maybe everyone else could, too."



Ekman and Friesen decided, then and there, to create a taxonomy of facial expressions. They combed through medical textbooks that outlined the facial muscles, and they identified every distinct muscular movement that the face could make. There were forty-three such movements. Ekman and Friesen called them action units. Then they sat across from each other, for days on end, and began manipulating each action unit in turn, first locating the muscle in their minds and then concentrating on isolating it, watching each other closely as they did, checking their movements in a mirror, making notes on how the wrinkle patterns on their faces would change with each muscle movement, and videotaping the movement for their records. On the few occasions when they couldn't make a particular movement, they went next door to the UCSF anatomy department, where a surgeon they knew would stick them with a needle and electrically stimulate the recalcitrant muscle. "That wasn't pleasant at all," Ekman recalls.

When each of those action units had been mastered, Ekman and Friesen began working action units in combination, layering one movement on top of another. The entire process took seven years. "There are three hundred combinations of two muscles," Ekman says. "If you add in a third, you get over four thousand. We took it up to five muscles, which is over ten thousand visible facial configurations." Most of those ten thousand facial expressions don't mean anything, of course. They are the kind of nonsense faces that children make. But, by working through each action-unit combination, Ekman and Friesen identified about three thousand that did seem to mean something, until they

had catalogued the essential repertoire of human facial displays of emotion.

Paul Ekman is now in his sixties. He is clean-shaven, with closely set eyes and thick, prominent eyebrows, and although he is of medium build, he seems much larger: there is something stubborn and substantial in his demeanor. He grew up in Newark, New Jersey, the son of a pediatrician, and entered the University of Chicago at fifteen. He speaks deliberately. Before he laughs, he pauses slightly, as if waiting for permission. He is the sort who makes lists and numbers his arguments. His academic writing has an orderly logic to it; by the end of an Ekman essay, each stray objection and problem has been gathered up and catalogued. Since the mid-1960s, he has been working out of a ramshackle Victorian townhouse at the University of California at San Francisco, where he holds a professorship. When I met Ekman, he sat in his office and began running through the action-unit configurations he had learned so long ago. He leaned forward slightly, placing his hands on his knees. On the wall behind him were photographs of his two heroes, Tomkins and Charles Darwin. "Everybody can do action unit four," he began. He lowered his brow, using his depressor glabellae, depressor supercilii, and corrugator. "Almost everyone can do A.U. nine." He wrinkled his nose, using his levator labii superioris alaeque nasi. "Everybody can do five." He contracted his levator palpebrae superioris, raising his upper eyelid.

I was trying to follow along with him, and he looked up at me. "You've got a very good five," he said generously. "The more deeply set your eyes are, the harder it



is to see the five. Then there's seven." He squinted. "Twelve." He flashed a smile, activating the zygomatic major. The inner parts of his eyebrows shot up. "That's A.U. one — distress, anguish." Then he used his frontalis, pars lateralis, to raise the outer half of his eyebrows. "That's A.U. two. It's also very hard, but it's worthless. It's not part of anything except Kabuki theater. Twenty-three is one of my favorites. It's the narrowing of the red margin of the lips. Very reliable anger sign. It's very hard to do voluntarily." He narrowed his lips. "Moving one ear at a time is still one of the hardest things to do. I have to really concentrate. It takes everything I've got." He laughed. "This is something my daughter always wanted me to do for her friends. Here we go." He wiggled his left ear, then his right ear. Ekman does not appear to have a particularly expressive face. He has the demeanor of a psychoanalyst, watchful and impassive, and his ability to transform his face so easily and quickly was astonishing. "There is one I can't do," he went on. "It's A.U. thirty-nine. Fortunately, one of my postdocs can do it. A.U. thirty-eight is dilating the nostrils. Thirty-nine is the opposite. It's the muscle that pulls them down." He shook his head and looked at me again. "Ooh! You've got a fantastic thirty-nine. That's one of the best I've ever seen. It's genetic. There should be other members of your family who have this heretofore unknown talent. You've got it, you've got it." He laughed again. "You're in a position to flash it at people. See, you should try that in a singles bar!"

Ekman then began to layer one action unit on top of another, in order to compose the more complicated facial expressions that we generally recognize as emotions.

Happiness, for instance, is essentially A.U. six and twelve — contracting the muscles that raise the cheek (orbicularis oculi, pars orbitalis) in combination with the zygomatic major, which pulls up the corners of the lips. Fear is A.U. one, two, and four, or, more fully, one, two, four, five, and twenty, with or without action units twenty-five, twenty-six, or twenty-seven. That is: the inner brow raiser (frontalis, pars medialis) plus the outer brow raiser (frontalis, pars lateralis) plus the brow-lowering depressor supercilii plus the levator palpebrae superioris (which raises the upper lid) plus the risorius (which stretches the lips) plus the parting of the lips (depressor labii) plus the masseter (which drops the jaw). Disgust? That's mostly A.U. nine, the wrinkling of the nose (levator labii superioris alaeque nasi), but it can sometimes be ten, and in either case it may be combined with A.U. fifteen or sixteen or seventeen.

Ekman and Friesen ultimately assembled all these combinations — and the rules for reading and interpreting them — into the Facial Action Coding System, or FACS, and wrote them up in a five-hundred-page document. It is a strangely riveting work, full of such details as the possible movements of the lips (elongate, de-elongate, narrow, widen, flatten, protrude, tighten, and stretch); the four different changes of the skin between the eyes and the cheeks (bulges, bags, pouches, and lines); and the critical distinctions between infraorbital furrows and the nasolabial furrow. John Gottman, whose research on marriage I wrote about in chapter 1, has collaborated with Ekman for years and uses the principles of FACS in analyzing the emotional states of couples. Other researchers have employed Ekman's system to study everything from schizophrenia to heart disease; it has even been put to use by computer animators at Pixar (*Toy Story*) and DreamWorks (*Shrek*). FACS takes weeks to master in its entirety, and only five hundred people around the world have been certified to use it in research. But those who have mastered it gain an extraordinary level of insight into the messages we send each other when we look into one another's eyes.



Ekman recalled the first time he saw Bill Clinton, during the 1992 Democratic primaries. "I was watching his facial expressions, and I said to my wife, 'This is Peck's Bad Boy,'" Ekman said. "This is a guy who wants to be caught with his hand in the cookie jar and have us love him for it anyway. There was this expression that's one of his favorites. It's that hand-in-the-cookie-jar, love-me-Mommy-because-I'm-a-rascal look. It's A.U. twelve, fifteen, seventeen, and twenty-four, with an eye roll." Ekman paused, then reconstructed that particular sequence of expressions on his face. He contracted his zygomatic major, A.U. twelve, in a classic smile, then tugged the corners of his lips down with his triangularis, A.U. fifteen. He flexed the mentalis, A.U. seventeen, which raises the chin, slightly pressed his lips together in A.U. twenty-four, and finally rolled his eyes — and it was as if Slick Willie himself were suddenly in the room.

"I knew someone who was on Clinton's communications staff. So I contacted him. I said, 'Look, Clinton's got this way of rolling his eyes along with a certain expression, and what it conveys is "I'm a bad boy." I don't think it's a good thing. I could teach him how not to do that in two to three hours.' And he said, 'Well, we can't take the risk that

he's known to be seeing an expert on lying.'" Ekman's voice trailed off. It was clear that he rather liked Clinton and that he wanted Clinton's expression to have been no more than a meaningless facial tic. Ekman shrugged. "Unfortunately, I guess, he needed to get caught — and he got caught."

## 3. *The Naked Face*

What Ekman is saying is that the face is an enormously rich source of information about emotion. In fact, he makes an even bolder claim — one central to understanding how mind reading works — and that is that the information on our face is not just a signal of what is going on inside our mind. In a certain sense, it *is* what is going on inside our mind.

The beginnings of this insight came when Ekman and Friesen were first sitting across from each other, working on expressions of anger and distress. "It was weeks before one of us finally admitted feeling terrible after a session where we'd been making one of those faces all day," Friesen says. "Then the other realized that he'd been feeling poorly, too, so we began to keep track." They then went back and began monitoring their bodies during particular facial movements. "Say you do A.U. one, raising the inner eyebrows, and six, raising the cheeks, and fifteen, the lowering of the corner of the lips," Ekman said, and then did all three. "What we discovered is that that expression alone is sufficient to create marked changes in the autonomic nervous system. When this first occurred, we were stunned. We weren't expecting this at all. And it happened



to both of us. We felt terrible. What we were generating were sadness, anguish. And when I lower my brows, which is four, and raise the upper eyelid, which is five, and narrow the eyelids, which is seven, and press the lips together, which is twenty-four, I'm generating anger. My heartbeat will go up ten to twelve beats. My hands will get hot. As I do it, I can't disconnect from the system. It's very unpleasant, very unpleasant."

Ekman, Friesen, and another colleague, Robert Levenson (who has also collaborated for years with John Gottman; psychology is a small world) decided to try to document this effect. They gathered a group of volunteers and hooked them up to monitors measuring their heart rate and body temperature — the physiological signals of such emotions as anger, sadness, and fear. Half of the volunteers were told to try to remember and relive a particularly stressful experience. The other half were simply shown how to create, on their faces, the expressions that corresponded to stressful emotions, such as anger, sadness, and fear. The second group, the people who were acting, showed the same physiological responses, the same heightened heart rate and body temperature, as the first group.

A few years later, a German team of psychologists conducted a similar study. They had a group of subjects look at cartoons, either while holding a pen between their lips — an action that made it impossible to contract either of the two major smiling muscles, the risorius and the zygomatic major — or while holding a pen clenched between their teeth, which had the opposite effect and forced them to smile. The people with the pen between their teeth

found the cartoons much funnier. These findings may be hard to believe, because we take it as a given that first we experience an emotion, and then we may — or may not — express that emotion on our face. We think of the face as the residue of emotion. What this research showed, though, is that the process works in the opposite direction as well. Emotion can also *start* on the face. The face is not a secondary billboard for our internal feelings. It is an equal partner in the emotional process.

This critical point has enormous implications for the act of mind-reading. Early in his career, for example, Paul Ekman filmed forty psychiatric patients, including a woman named Mary, a forty-two-year-old housewife. She had attempted suicide three times, and she survived the last attempt — an overdose of pills — only because someone found her in time and rushed her to the hospital. Her grown children had left home, and her husband was inattentive, and she was depressed. When she first went to the hospital, she did nothing but sit and cry, but she seemed to respond well to therapy. After three weeks, she told her doctor that she was feeling much better and wanted a weekend pass to see her family. The doctor agreed, but just before Mary was to leave the hospital, she confessed that the real reason she wanted a weekend pass was to make another suicide attempt. Several years later, when a group of young psychiatrists asked Ekman how they could tell when suicidal patients were lying, he remembered the film taken of Mary and decided to see if it held the answer. If the face really was a reliable guide to emotion, he reasoned, shouldn't he be able to look back at the film and see that Mary was lying when she said she was feeling better?



Ekman and Friesen began to analyze the film for clues. They played it over and over for dozens of hours, examining in slow motion every gesture and expression. Finally, they saw what they were looking for: when Mary's doctor asked her about her plans for the future, a look of utter despair flashed across her face so quickly that it was almost imperceptible.

Ekman calls that kind of fleeting look a micro expression, which is a very particular and critical kind of facial expression. Many facial expressions can be made voluntarily. If I'm trying to look stern as I give you a tongue-lashing, I'll have no difficulty doing so, and you'll have no difficulty interpreting my glare. But our faces are also governed by a separate, involuntary system that makes expressions that we have no conscious control over. Few of us, for instance, can voluntarily do A.U. one, the sadness sign. (A notable exception, Ekman points out, is Woody Allen, who uses his frontalis, pars medialis to create his trademark look of comic distress.) Yet we raise our inner eyebrows without thinking when we are unhappy. Watch a baby just as he or she starts to cry, and you'll often see the frontalis, pars medialis shoot up as if it were on a string. Similarly, there is an expression that Ekman has dubbed the Duchenne smile, in honor of the nineteenth-century French neurologist Guillaume Duchenne, who first attempted to document with a camera the workings of the muscles of the face. If I were to ask you to smile, you would flex your zygomatic major. By contrast, if you were to smile spontaneously, in the presence of genuine emotion, you would not only flex your zygomatic but also tighten the orbicularis oculi, pars orbitalis, which is the

muscle that encircles the eye. It is almost impossible to tighten the orbicularis oculi, pars orbitalis on demand, and it is equally difficult to stop it from tightening when we smile at something genuinely pleasurable. This kind of smile "does not obey the will," Duchenne wrote. "Its absence unmasks the false friend."

Whenever we experience a basic emotion, that emotion is automatically expressed by the muscles of the face. That response may linger on the face for just a fraction of a second or be detectable only if electrical sensors are attached to the face. But it's always there. Silvan Tomkins once began a lecture by bellowing, "The face is like the penis!" What he meant was that the face has, to a large extent, a mind of its own. This doesn't mean we have no control over our faces. We can use our voluntary muscular system to try to suppress those involuntary responses. But, often, some little part of that suppressed emotion — such as the sense that I'm really unhappy even if I deny it — leaks out. That's what happened to Mary. Our voluntary expressive system is the way we intentionally signal our emotions. But our involuntary expressive system is in many ways even more important: it is the way we have been equipped by evolution to signal our authentic feelings.

"You must have had the experience where somebody comments on your expression and you didn't know you were making it," Ekman says. "Somebody asks you, 'What are you getting upset about?' or 'Why are you smirking?' You can hear your voice, but you can't see your face. If we knew what was on our face, we would be better at concealing it. But that wouldn't necessarily be a good thing. Imagine if there were a switch that all of us had, to



turn off the expressions on our face at will. If babies had that switch, we wouldn't know what they were feeling. They'd be in trouble. You could make an argument, if you wanted to, that the system evolved so that parents would be able to take care of kids. Or imagine if you were married to someone with a switch. It would be impossible. I don't think mating and infatuation and friendships and closeness would occur if our faces didn't work that way."

Ekman slipped a tape from the O.J. Simpson trial into the VCR. It showed Kato Kaelin, Simpson's shaggy-haired houseguest, being questioned by Marcia Clark, the lead prosecutor in the case. Kaelin sits in the witness box, with a vacant look on his face. Clark asks a hostile question. Kaelin leans forward and answers her softly. "Did you see that?" Ekman asked me. I saw nothing, just Kato being Kato — harmless and passive. Ekman stopped the tape, rewound it, and played it back in slow motion. On the screen, Kaelin moved forward to answer the question, and in that fraction of a second, his face was utterly transformed. His nose wrinkled, as he flexed his levator labii superioris alaeque nasi. His teeth were bared, his brows lowered. "It was almost totally A.U. nine," Ekman said. "It's disgust, with anger there as well, and the clue to that is that when your eyebrows go down, typically your eyes are not as open as they are here. The raised upper eyelid is a component of anger, not disgust. It's very quick." Ekman stopped the tape and played it again, peering at the screen. "You know, he looks like a snarling dog."

Ekman showed another clip, this one from a press conference given by Harold "Kim" Philby in 1955. Philby had not yet been revealed as a Soviet spy, but two of his

colleagues, Donald Maclean and Guy Burgess, had just defected to the Soviet Union. Philby is wearing a dark suit and a white shirt. His hair is straight and parted on the left. His face has the hauteur of privilege.

"Mr. Philby," a reporter asks, "Mr. Macmillan, the foreign secretary, said there was no evidence that you were the so-called third man who allegedly tipped off Burgess and Maclean. Are you satisfied with that clearance that he gave you?"

Philby answers confidently, in the plummy tones of the English upper class. "Yes, I am."

"Well, if there was a third man, were you in fact the third man?"

"No," Philby says, just as forcefully. "I was not."

Ekman rewound the tape and replayed it in slow motion. "Look at this," he said, pointing to the screen. "Twice, after being asked serious questions about whether he's committed treason, he's going to smirk. He looks like the cat who ate the canary." The expression came and went in no more than a few milliseconds. But at quarter speed it was painted on his face: the lips pressed together in a look of pure smugness. "He's enjoying himself, isn't he?" Ekman went on. "I call this 'duping delight,' the thrill you get from fooling other people." Ekman started up the VCR again. "There's another thing he does," he said. On the screen, Philby is answering another question: "In the second place, the Burgess-Maclean affair has raised issues of great" — he pauses — "delicacy." Ekman went back to the pause and froze the tape. "Here it is," he said. "A very subtle microexpression of distress or unhappiness. It's only in the eyebrows — in fact, just in one eyebrow." Sure enough, Philby's right inner eyebrow was raised in an unmistakable A.U. one. "It's very brief," Ekman said. "He's not doing it voluntarily. And it totally contradicts all his confidence and assertiveness. It comes when he's talking about Burgess and Maclean, whom he had tipped off. It's a hot spot that suggests, 'You shouldn't trust what you hear.'"



What Ekman is describing, in a very real sense, is the physiological basis of how we thin-slice other people. We can all mind-read effortlessly and automatically because the clues we need to make sense of someone or some social situation are right there on the faces of those in front of us. We may not be able to read faces as brilliantly as someone like Paul Ekman or Silvan Tomkins can, or pick up moments as subtle as Kato Kaelin's transformation into a snarling dog. But there is enough accessible information on a face to make everyday mind reading possible. When someone tells us "I love you," we look immediately and directly at him or her because by looking at the face, we can *know* — or, at least, we can know a great deal more — about whether the sentiment is genuine. Do we see tenderness and pleasure? Or do we catch a fleeting microexpression of distress and unhappiness flickering across his or her face? A baby looks into your eyes when you cup your hands over hers because she knows she can find an explanation in your face. Are you contracting action units six and twelve (the orbicularis oculi, pars orbitalis in combination with the zygomatic major) in a sign of happiness? Or are you contracting action units one, two, four, five, and twenty (the frontalis, pars medialis; the frontalis, pars lateralis; the depressor supercilii; the levator palpebrae su-

perioris; and the risorius) in what even a child intuitively understands as the clear signal of fear? We make these kinds of complicated, lightning-fast calculations very well. We make them every day, and we make them without thinking. And this is the puzzle of the Amadou Diallo case, because in the early hours of February 4, 1999, Sean Carroll and his fellow officers for some reason could not do this at all. Diallo was innocent, curious, and terrified — and every one of those emotions must have been written all over his face. Yet they saw none of it. Why?

## 4. *A Man, a Woman, and a Light Switch*

The classic model for understanding what it means to lose the ability to mind-read is the condition of autism. When someone is autistic, he or she is, in the words of the British psychologist Simon Baron-Cohen, "mind-blind." People with autism find it difficult, if not impossible, to do all of the things that I've been describing so far as natural and automatic human processes. They have difficulty interpreting nonverbal cues, such as gestures and facial expressions or putting themselves inside someone else's head or drawing understanding from anything other than the literal meaning of words. Their first-impression apparatus is fundamentally disabled, and the way that people with autism see the world gives us a very good sense of what happens when our mind-reading faculties fail.

One of the country's leading experts on autism is a man named Ami Klin. Klin teaches at Yale University's Child Study Center in New Haven, where he has a patient whom he has been studying for many years whom I'll



call Peter. Peter is in his forties. He is highly educated and works and lives independently. "This is a very high-functioning individual. We meet weekly, and we talk," Klin explains. "He's very articulate, but he has no intuition about things, so he needs me to define the world for him." Klin, who bears a striking resemblance to the actor Martin Short, is half Israeli and half Brazilian, and he speaks with an understandably peculiar accent. He has been seeing Peter for years, and he speaks of his condition not with condescension or detachment but matter-of-factly, as if describing a minor character tic. "I talk to him every week, and the sense that I have in talking to him is that I could do anything. I could pick my nose. I could take my pants down. I could do some work here. Even though he is looking at me, I don't have the sense of being scrutinized or monitored. He focuses very much on what I say. The words mean a great deal to him. But he doesn't focus at all on the way my words are contextualized with facial expressions and nonverbal cues. Everything that goes on inside the mind — that he cannot observe directly — is a problem for him. Am I his therapist? Not really. Normal therapy is based on people's ability to have insight into their own motivations. But with him, insight wouldn't take you very far. So it's more like problem solving."

One of the things that Klin wanted to discover, in talking to Peter, was how someone with his condition makes sense of the world, so he and his colleagues devised an ingenious experiment. They decided to show Peter a movie and then follow the direction of his eyes as he looked at the screen. The movie they chose was the 1966 film version of the Edward Albee play *Who's Afraid of Virginia Woolf?*

starring Richard Burton and Elizabeth Taylor as a husband and wife who invite a much younger couple, played by George Segal and Sandy Dennis, for what turns out to be an intense and grueling evening. "It's my favorite play ever, and I love the movie. I love Richard Burton. I love Elizabeth Taylor," Klin explains, and for what Klin was trying to do, the film was perfect. People with autism are obsessed with mechanical objects, but this was a movie that followed very much the spare, actor-focused design of the stage. "It's tremendously contained," Klin says. "It's about four people and their minds. There are very few inanimate details in that movie that would be distracting to someone with autism. If I had used *Terminator Two*, where the protagonist is a gun, I wouldn't have got those results. It's all about intensive, engaging social interaction at multiple levels of meaning, emotion, and expression. What we are trying to get at is people's search for meaning. So that's why I chose *Who's Afraid of Virginia Woolf?* I was interested in getting to see the world through the eyes of an autistic person."

Klin had Peter put on a hat with a very simple, but powerful, eye-tracking device composed of two tiny cameras. One camera recorded the movement of Peter's fovea — the centerpiece of his eye. The other camera recorded whatever it was Peter was looking at, and then the two images were superimposed. This meant that on every frame of the movie, Klin could draw a line showing where Peter was looking at that moment. He then had people without autism watch the movie as well, and he compared Peter's eye movements with theirs. In one



scene, for example, Nick (George Segal) is making polite conversation, and he points to the wall of host George's (Richard Burton's) study and asks, "Who did the painting?" The way you and I would look at that scene is straightforward: our eyes would follow in the direction that Nick is pointing, alight on the painting, swivel back to George's eyes to get his response, and then return to Nick's face, to see how he reacts to the answer. All of that takes place in a fraction of a second, and on Klin's visual-scanning pictures, the line representing the gaze of the normal viewer forms a clean, straight-edged triangle from Nick to the painting to George and back again to Nick. Peter's pattern, though, is a little different. He starts somewhere around Nick's neck. But he doesn't follow the direction of Nick's arm, because interpreting a pointing gesture requires, if you think about it, that you instantaneously inhabit the mind of the person doing the pointing. You need to read the mind of the pointer, and, of course, people with autism can't read minds. "Children respond to pointing gestures by the time they are twelve months old," Klin said. "This is a man who is forty-two years old and very bright, and he's not doing that. Those are the kinds of cues that children are learning naturally — and he just doesn't pick up on them."

So what does Peter do? He hears the words "painting" and "wall," so he looks for paintings on the wall. But there are three in the general vicinity. Which one is it? Klin's visual-scanning pictures show Peter's gaze moving frantically from one picture to the other. Meanwhile, the conversation has already moved on. The only way Peter

could have made sense of that scene is if Nick had been perfectly, verbally explicit — if he had said, "Who did that painting to the left of the man and the dog?" In anything less than a perfectly literal environment, the autistic person is lost.

There's another critical lesson in that scene. The normal viewers looked at the eyes of George and Nick when they were talking, and they did that because when people talk, we listen to their words and watch their eyes in order to pick up on all those expressive nuances that Ekman has so carefully catalogued. But Peter didn't look at anyone's eyes in that scene. At another critical moment in the movie, when, in fact, George and Martha (Elizabeth Taylor) are locked in a passionate embrace, Peter looked not at the eyes of the kissing couple — which is what you or I would do — but at the light switch on the wall behind them. That's not because Peter objects to people or finds the notion of intimacy repulsive. It's because if you cannot mind-read — if you can't put yourself in the mind of someone else — then there's nothing special to be gained by looking at eyes and faces.

One of Klin's colleagues at Yale, Robert T. Schultz, once did an experiment with what is called an FMRI (functional magnetic resonance imagery), a highly sophisticated brain scanner that shows where the blood is flowing in the brain at any given time — and hence, which part of the brain is in use. Schultz put people in the FMRI machine and had them perform a very simple task in which they were given either pairs of faces or pairs of objects (such as chairs or hammers) and they had to press a button indicating whether the pairs were the same or different.



Normal people, when they were looking at the faces, used a part of their brain called the fusiform gyrus, which is an incredibly sophisticated piece of brain software that allows us to distinguish among the literally thousands of faces that we know. (Picture in your mind the face of Marilyn Monroe. Ready? You just used your fusiform gyrus.) When the normal participants looked at the chair, however, they used a completely different and less powerful part of the brain — the inferior temporal gyrus — which is normally reserved for objects. (The difference in the sophistication of those two regions explains why you can recognize Sally from the eighth grade forty years later but have trouble picking out your bag on the airport luggage carousel.) When Schultz repeated the experiment with autistic people, however, he found that they used their object-recognition area for both the chairs and the faces. In other words, on the most basic neurological level, for someone with autism, a face is just another object. Here is one of the earliest descriptions of an autistic patient in the medical literature: "He never looked up at people's faces. When he had any dealings with persons at all, he treated them, or rather parts of them, as if they were objects. He would use a hand to lead him. He would, in playing, butt his head against his mother as at other times he did against a pillow. He allowed his boarding mother's hand to dress him, paying not the slightest attention to her."

So, when Peter looked at the scene of Martha and George kissing, their two faces did not automatically command his attention. What he saw were three objects — a man, a woman, and a light switch. And what did he prefer? As it happens, the light switch. "I know for [Peter] that

light switches have been important in his life," says Klin. "He sees a light switch, and he gravitates toward it. It's like if you were a Matisse connoisseur, and you look at a lot of pictures, and then you'd go, ahh, *there* is the Matisse. So he goes, *there* is the light switch. He's seeking meaning, organization. He doesn't like confusion. All of us gravitate toward things that mean something to us, and for most of us, that's people. But if people don't anchor meaning for you, then you seek something that does."

Perhaps the most poignant scene Klin studied comes at a point in the movie when Martha is sitting next to Nick, flirting outrageously, even putting a hand on his thigh. In the background, his back slightly turned to them, lurks an increasingly angry and jealous George. As the scene unfolds, the normal viewer's eyes move in an almost perfect triangle from Martha's eyes to Nick's eyes to George's eyes and then back to Martha's, monitoring the emotional states of all three as the temperature in the room rises. But Peter? He starts at Nick's mouth, and then his eyes drop to the drink in Nick's hand, and then his gaze wanders to a brooch on Martha's sweater. *He never looks at George at all*, so the entire emotional meaning of the scene is lost on him.

"There's a scene where George is about to lose his temper," says Warren Jones, who worked with Klin on the experiment. "He goes to the closet and pulls a gun down from the shelf, and points it directly at Martha and pulls the trigger. And when he does, an umbrella pops out the front of the barrel. But we have no idea until it comes out that it's a ruse — so there is this genuine moment of fear. And one of the most telltale things is that the classic



autistic individual will laugh out loud and find it to be this moment of real physical comedy. They've missed the emotional basis for the act. They read only the superficial aspect that he pulls the trigger, an umbrella pops out, and they walk away thinking, those people were having a good time."

Peter's movie-watching experiment is a perfect example of what happens when mind reading fails. Peter is a highly intelligent man. He has graduate degrees from a prestigious university. His IQ is well above normal, and Klin speaks of him with genuine respect. But because he lacks one very basic ability — the ability to mind-read — he can be presented with that scene in *Who's Afraid of Virginia Woolf?* and come to a conclusion that is socially completely and catastrophically wrong. Peter, understandably, makes this kind of mistake often: he has a condition that makes him permanently mind-blind. But I can't help but wonder if, under certain circumstances, the rest of us could momentarily think like Peter as well. What if it were possible for autism — for mind-blindness — to be a temporary condition instead of a chronic one? Could that explain why sometimes otherwise normal people come to conclusions that are completely and catastrophically wrong?

## 5. *Arguing with a Dog*

In the movies and in detective shows on television, people fire guns all the time. They shoot and shoot and run after people, and sometimes they kill them, and when they do, they stand over the body and smoke a cigarette and then

go and have a beer with their partner. To hear Hollywood tell it, shooting a gun is a fairly common and straightforward act. The truth is, though, that it isn't. Most police officers — well over 90 percent — go their whole career without ever firing at anyone, and those who do describe the experience as so unimaginably stressful that it seems reasonable to ask if firing a gun could be the kind of experience that could cause temporary autism.

Here, for example, are excerpts of interviews that the University of Missouri criminologist David Klinger did with police officers for his fascinating book *Into the Kill Zone*. The first is with an officer who fired on a man who was threatening to kill his partner, Dan:

> He looked up, saw me, and said, "Oh, shit." Not like "Oh, shit, I'm scared." But like "Oh, shit, now here's somebody else I gotta kill" — real aggressive and mean. Instead of continuing to push the gun at Dan's head, he started to try to bring it around on me. This all happened real fast — in milliseconds — and at the same time, I was bringing my gun up. Dan was still fighting with him, and the only thought that came through my mind was "Oh, dear God, don't let me hit Dan." I fired five rounds. My vision changed as soon as I started to shoot. It went from seeing the whole picture to just the suspect's head. Everything else just disappeared. I didn't see Dan anymore, didn't see anything else. All I could see was the suspect's head.
>
> I saw four of my five rounds hit. The first one hit him on his left eyebrow. It opened up a hole and the guy's head snapped back and he said, "Ooh," like, "Ooh, you got me." He still continued to turn the gun toward me,



> and I fired my second round. I saw a red dot right below the base of his left eye, and his head kind of turned sideways. I fired another round. It hit on the outside of his left eye, and his eye exploded, just ruptured and came out. My fourth round hit just in front of his left ear. The third round had moved his head even further sideways to me, and when the fourth round hit, I saw a red dot open on the side of his head, then close up. I didn't see where my last round went. Then I heard the guy fall backwards and hit the ground.

Here's another:

> When he started toward us, it was almost like it was in slow motion and everything went into a tight focus. . . . When he made his move, my whole body just tensed up. I don't remember having any feeling from my chest down. Everything was focused forward to watch and react to my target. Talk about an adrenaline rush! Everything tightened up, and all my senses were directed forward at the man running at us with a gun. My vision was focused on his torso and the gun. I couldn't tell you what his left hand was doing. I have no idea. I was watching the gun. The gun was coming down in front of his chest area, and that's when I did my first shots.
>
> I didn't hear a thing, not one thing. Alan had fired one round when I shot my first pair, but I didn't hear him shoot. He shot two more rounds when I fired the second time, but I didn't hear any of those rounds, either. We stopped shooting when he hit the floor and slid into me. Then I was on my feet standing over the guy. I don't even remember pushing myself up. All I know is the next thing I knew I was standing on two feet looking

down at the guy. I don't know how I got there, whether I pushed up with my hands, or whether I pulled my knees up underneath. I don't know, but once I was up, I was hearing things again because I could hear brass still clinking on the tile floor. Time had also returned to normal by then, because it had slowed down during the shooting. That started as soon as he started toward us. Even though I knew he was running at us, it looked like he was moving in slow motion. Damnedest thing I ever saw.

I think you'll agree that these are profoundly strange stories. In the first instance, the officer appears to be describing something that is quite impossible. How can someone watch his bullets hit someone? Just as strange is the second man's claim not to have heard the sound of his gun going off. How can that be? Yet, in interviews with police officers who have been involved with shootings, these same details appear again and again: extreme visual clarity, tunnel vision, diminished sound, and the sense that time is slowing down. This is how the human body reacts to extreme stress, and it makes sense. Our mind, faced with a life-threatening situation, drastically limits the range and amount of information that we have to deal with. Sound and memory and broader social understanding are sacrificed in favor of heightened awareness of the threat directly in front of us. In a critical sense, the police officers whom Klinger describes performed better because their senses narrowed: that narrowing allowed them to focus on the threat in front of them.



But what happens when this stress response is taken to an extreme? Dave Grossman, a former army lieutenant colonel and the author of *On Killing*, argues that the optimal state of "arousal" — the range in which stress improves performance — is when our heart rate is between 115 and 145 beats per minute. Grossman says that when he measured the heart rate of champion marksman Ron Avery, Avery's pulse was at the top of that range when he was performing in the field. The basketball superstar Larry Bird used to say that at critical moments in the game, the court would go quiet and the players would seem to be moving in slow motion. He clearly played basketball in that same optimal range of arousal in which Ron Avery performed. But very few basketball players see the court as clearly as Larry Bird did, and that's because very few people play in that optimal range. Most of us, under pressure, get *too* aroused, and past a certain point, our bodies begin shutting down so many sources of information that we start to become useless.

"After 145," Grossman says, "bad things begin to happen. Complex motor skills start to break down. Doing something with one hand and not the other becomes very difficult. . . . At 175, we begin to see an absolute breakdown of cognitive processing. . . . The forebrain shuts down, and the mid-brain — the part of your brain that is the same as your dog's (all mammals have that part of the brain) — reaches up and hijacks the forebrain. Have you ever tried to have a discussion with an angry or frightened human being? You can't do it. . . . You might as well try to argue with your dog." Vision becomes even more

restricted. Behavior becomes inappropriately aggressive. In an extraordinary number of cases, people who are being fired upon void their bowels because at the heightened level of threat represented by a heart rate of 175 and above, the body considers that kind of physiological control a nonessential activity. Blood is withdrawn from our outer muscle layer and concentrated in core muscle mass. The evolutionary point of that is to make the muscles as hard as possible — to turn them into a kind of armor and limit bleeding in the event of injury. But that leaves us clumsy and helpless. Grossman says that everyone should practice dialing 911 for this very reason, because he has heard of too many situations where, in an emergency, people pick up the phone and cannot perform this most basic of functions. With their heart rate soaring and their motor coordination deteriorating, they dial 411 and not 911 because that's the only number they remember, or they forget to press "send" on their cell phone, or they simply cannot pick out the individual numbers at all. "You must rehearse it," Grossman says, "because only if you have rehearsed it will it be there."

This is precisely the reason that many police departments in recent years have banned high-speed chases. It's not just because of the dangers of hitting some innocent bystander *during* the chase, although that is clearly part of the worry, since about three hundred Americans are killed accidentally every year during chases. It's also because of what happens *after* the chase, since pursuing a suspect at high speed is precisely the kind of activity that pushes police officers into this dangerous state of high arousal. "The L.A. riot was started by what cops did to Rodney King at



the end of the high-speed chase," says James Fyfe, head of training for the NYPD, who has testified in many police brutality cases. "The Liberty City riot in Miami in 1980 was started by what the cops did at the end of a chase. They beat a guy to death. In 1986, they had another riot in Miami based on what cops did at the end of the chase. Three of the major race riots in this country over the past quarter century have been caused by what cops did at the end of a chase."

"When you get going at high speeds, especially through residential neighborhoods, that's scary," says Bob Martin, a former high-ranking LAPD officer. "Even if it is only fifty miles per hour. Your adrenaline and heart start pumping like crazy. It's almost like a runner's high. It's a very euphoric kind of thing. You lose perspective. You get wrapped up in the chase. There's that old saying — 'a dog in the hunt doesn't stop to scratch its fleas.' If you've ever listened to a tape of an officer broadcasting in the midst of pursuit, you can hear it in the voice. They almost yell. For new officers, there's almost hysteria. I remember my first pursuit. I was only a couple of months out of the academy. It was through a residential neighborhood. A couple of times we even went airborne. Finally we captured him. I went back to the car to radio in and say we were okay, and I couldn't even pick up the radio, I was shaking so badly." Martin says that the King beating was precisely what one would expect when two parties — both with soaring heartbeats and predatory cardiovascular reactions — encounter each other after a chase. "At a key point, Stacey Koon" — one of the senior officers at the scene of the arrest — "told the officers to back off," Martin says. "But they ignored

him. Why? Because they didn't hear him. They had shut down."

Fyfe says that he recently gave a deposition in a case in Chicago in which police officers shot and killed a young man at the end of a chase, and unlike Rodney King, he wasn't resisting arrest. He was just sitting in his car. "He was a football player from Northwestern. His name was Robert Russ. It happened the same night the cops there shot another kid, a girl, at the end of a vehicle pursuit, in a case that Johnnie Cochran took and got over a $20 million settlement. The cops said he was driving erratically. He led them on a chase, but it wasn't even that high-speed. They never got above seventy miles per hour. After a while, they ran him off the road. They spun his car out on the Dan Ryan Expressway. The instructions on vehicle stops like that are very detailed. You are not supposed to approach the car. You are supposed to ask the driver to get out. Well, two of the cops ran up ahead and opened the passenger side door. The other asshole was on the other side, yelling at Russ to open the door. But Russ just sat there. I don't know what was going through his head. But he didn't respond. So this cop smashes the left rear window of the car and fires a single shot, and it hits Russ in the hand and chest. The cop says that he said, 'Show me your hands, show me your hands,' and he's claiming now that Russ was trying to grab his gun. I don't know if that was the case. I have to accept the cop's claim. But it's beside the point. It's still an unjustified shooting because he shouldn't have been anywhere near the car, and he shouldn't have broken the window."

Was this officer mind-reading? Not at all. Mind-reading allows us to adjust and update our perceptions of



the intentions of others. In the scene in *Who's Afraid of Virginia Woolf?* where Martha is flirting with Nick while George lurks jealously in the background, our eyes bounce from Martha's eyes to George's to Nick's and around and around again because we don't know what George is going to do. We keep gathering information on him because we want to find out. But Ami Klin's autistic patient looked at Nick's mouth and then at his drink and then at Martha's brooch. In his mind he processed human beings and objects in the same way. He didn't see individuals, with their own emotions and thoughts. He saw a collection of inanimate objects in the room and constructed a system to explain them — a system that he interpreted with such rigid and impoverished logic that when George fires his shotgun at Martha and an umbrella pops out, he laughed out loud. This, in a way, is what that officer on the Dan Ryan Expressway did as well. In the extreme excitement of the chase, he stopped reading Russ's mind. His vision and his thinking narrowed. He constructed a rigid system that said that a young black man in a car running from the police had to be a dangerous criminal, and all evidence to the contrary that would ordinarily have been factored into his thinking — the fact that Russ was just sitting in his car and that he had never gone above seventy miles per hour — did not register at all. Arousal leaves us mind-blind.

## 6. *Running Out of White Space*

Have you ever seen the videotape of the assassination attempt on Ronald Reagan? It's the afternoon of March 30, 1981. Reagan has just given a speech at the Washington

Hilton Hotel and is walking out a side door toward his limousine. He waves to the crowd. Voices cry out: "President Reagan! President Reagan!" Then a young man named John Hinckley lunges forward with a .22-caliber pistol in his hand and fires six bullets at Reagan's entourage at point-blank range before being wrestled to the ground. One of the bullets hits Reagan's press secretary, James Brady, in the head. A second bullet hits a police officer, Thomas Delahanty, in the back. A third hits Secret Service agent Timothy McCarthy in the chest, and a fourth ricochets off the limousine and pierces Reagan's lung, missing his heart by inches. The puzzle of the Hinckley shooting, of course, is how he managed to get at Reagan so easily. Presidents are surrounded by bodyguards, and bodyguards are supposed to be on the lookout for people like John Hinckley. The kind of people who typically stand outside a hotel on a cold spring day waiting for a glimpse of their President are well-wishers, and the job of the bodyguard is to scan the crowd and look for the person who doesn't fit, the one who doesn't wish well at all. Part of what bodyguards have to do is read faces. They have to mind-read. So why didn't they read Hinckley's mind? The answer is obvious if you watch the video — and it's the second critical cause of mind-blindnesss: there is no time.

Gavin de Becker, who runs a security firm in Los Angeles and is the author of the book *The Gift of Fear*, says that the central fact in protection is the amount of "white space," which is what he calls the distance between the target and any potential assailant. The more white space there



is, the more time the bodyguard has to react. And the more time the bodyguard has, the better his ability to read the mind of any potential assailant. But in the Hinckley shooting, there was no white space. Hinckley was in a knot of reporters who were standing within a few feet of the President. The Secret Service agents became aware of him only when he starting firing. From the first instance when Reagan's bodyguards realized that an attack was under way — what is known in the security business as the moment of recognition — to the point when no further harm was done was 1.8 seconds. "The Reagan attack involves heroic reactions by several people," de Becker says. "Nonetheless, every round was still discharged by Hinckley. In other words, those reactions didn't make one single difference, because he was too close. In the videotape you see one bodyguard. He gets a machine gun out of his briefcase and stands there. Another has his gun out, too. What are they going to shoot at? It's over." In those 1.8 seconds, all the bodyguards could do was fall back on their most primitive, automatic (and, in this case, useless) impulse — to draw their weapons. They had no chance at all to understand or anticipate what was happening. "When you remove time," de Becker says, "you are subject to the lowest-quality intuitive reaction."

We don't often think about the role of time in life-or-death situations, perhaps because Hollywood has distorted our sense of what happens in a violent encounter. In the movies, gun battles are drawn-out affairs, where one cop has time to whisper dramatically to his partner, and the villain has time to call out a challenge, and the gunfight

builds slowly to a devastating conclusion. Just telling the story of a gun battle makes what happened seem to have taken much longer than it did. Listen to de Becker describe the attempted assassination a few years ago of the president of South Korea: "The assassin stands up, and he shoots himself in the leg. That's how it starts. He's nervous out of his mind. Then he shoots at the president and he misses. Instead he hits the president's wife in the head. Kills the wife. The bodyguard gets up and shoots back. He misses. He hits an eight-year-old boy. It was a screw-up on all sides. Everything went wrong." How long do you think that whole sequence took? Fifteen seconds? Twenty seconds? No, three-point-five seconds.

I think that we become temporarily autistic also in situations when we run out of time. The psychologist Keith Payne, for instance, once sat people down in front of a computer and primed them — just like John Bargh did in the experiments described in chapter 2 — by flashing either a black face or a white face on a computer screen. Then Payne showed his subjects either a picture of a gun or a picture of a wrench. The image was on the screen for 200 milliseconds, and everyone was supposed to identify what he or she had just seen on the screen. It was an experiment inspired by the Diallo case. The results were what you might expect. If you are primed with a black face first, you'll identify the gun as a gun a little more quickly than if you are primed with a white face first. Then Payne redid his experiment, only this time he sped it up. Instead of letting people respond at their own pace, he forced them to make a decision within 500 milliseconds — half a second. Now people began to make errors. They were quicker to



call a gun a gun when they saw a black face first. But when they saw a black face first, they were also quicker to call a wrench a gun. Under time pressure, they began to behave just as people do when they are highly aroused. They stopped relying on the actual evidence of their senses and fell back on a rigid and unyielding system, a stereotype.

"When we make a split-second decision," Payne says, "we are really vulnerable to being guided by our stereotypes and prejudices, even ones we may not necessarily endorse or believe." Payne has tried all kinds of techniques to reduce this bias. To try to put them on their best behavior, he told his subjects that their performance would be scrutinized later by a classmate. It made them even more biased. He told some people precisely what the experiment was about and told them explicitly to avoid stereotypes based on race. It didn't matter. The only thing that made a difference, Payne found, was slowing the experiment down and forcing people to wait a beat before identifying the object on the screen. Our powers of thin-slicing and snap judgments are extraordinary. But even the giant computer in our unconscious needs a moment to do its work. The art experts who judged the Getty kouros needed to *see* the kouros before they could tell whether it was a fake. If they had merely glimpsed the statue through a car window at sixty miles per hour, they could only have made a wild guess at its authenticity.

For this very reason, many police departments have moved, in recent years, toward one-officer squad cars instead of two-. That may sound like a bad idea, because surely having two officers work together makes more sense. Can't they provide backup for each other? Can't

they more easily and safely deal with problematic situations? The answer in both cases is no. An officer with a partner is no safer than an officer on his own. Just as important, two-officer teams are more likely to have complaints filed against them. With two officers, encounters with citizens are far more likely to end in an arrest or an injury to whomever they are arresting or a charge of assaulting a police officer. Why? *Because when police officers are by themselves, they slow things down, and when they are with someone else, they speed things up.* "All cops want two-man cars," says de Becker. "You have a buddy, someone to talk to. But one-man cars get into less trouble because you reduce bravado. A cop by himself makes an approach that is entirely different. He is not as prone to ambush. He doesn't charge in. He says, 'I'm going to wait for the other cops to arrive.' He acts more kindly. He allows more time."

Would Russ, the young man in the car in Chicago, have ended up dead if he had been confronted by just one officer? It's hard to imagine that he would have. A single officer — even a single officer in the heat of the chase — would have had to pause and wait for backup. It was the false safety of numbers that gave the three officers the bravado to rush the car. "You've got to slow the situation down," Fyfe says. "We train people that time is on their side. In the Russ case, the lawyers for the other side were saying that this was a fast-breaking situation. But it was only fast-breaking because the cops let it become one. He was stopped. He wasn't going anywhere."

What police training does, at its best, is teach officers how to keep themselves out of this kind of trouble; to



avoid the risk of momentary autism. In a traffic stop, for instance, the officer is trained to park behind the car. If it's at night, he shines his brights directly into the car. He walks toward the car on the driver's side, then stops and stands just behind the driver, shining his flashlight over the shoulder onto his or her lap. I've had this happen to me, and I always feel a bit like I'm being disrespected. Why can't the officer stand and talk to me face-to-face, like a normal human being? The reason is that it would be virtually impossible for me to pull a gun on the officer if he's standing behind me. First of all, the officer is shining his flashlight on my lap, so he can see where my hands are and whether I'm going for a gun. And even if I get my hands on the gun, I have to twist almost entirely around in my seat, lean out the window, and fire around the door pillar at the officer (and remember, I'm blinded by his brights) — and all this in his full view. The police procedure, in other words, is for my benefit: it means that the only way the officer will ever draw his gun on me is if I engage in a drawn-out and utterly unambiguous sequence of actions.

Fyfe once ran a project in Dade County, Florida, where there was an unusually high number of violent incidents between police officers and civilians. You can imagine the kind of tension that violence caused. Community groups accused the police of being insensitive and racist. The police responded with anger and defensiveness; violence, they said, was a tragic but inevitable part of police work. It was an all-too-familiar script. Fyfe's response, though, was to sidestep that controversy and conduct a study. He put observers in squad cars and had them keep a running score of how the officers' behavior matched up

with proper training techniques. "It was things like, did the officer take advantage of available cover?" he said. "We train officers to make themselves the smallest possible target, so you leave it to the bad guy to decide whether they'll be shooting or not. So we were looking at things like, did the officer take advantage of available cover or did he just walk in the front door? Did he keep his gun away from the individual at all times? Did he keep his flashlight in his weak hand? In a burglary call, did they call back for more information or did they just say ten-four? Did they ask for backup? Did they coordinate their approach? — you know, you be the shooter, I'll cover you. Did they take a look around the neighborhood? Did they position another car at the back of the building? When they were inside the place, did they hold their flashlights off to the side? — because if the guy happens to be armed, he's going to shoot at the flashlight. On a traffic stop, did they look at the back of the car before approaching the driver? These kind of things."

What Fyfe found was that the officers were really good when they were face-to-face with a suspect and when they had the suspect in custody. In those situations, they did the "right" thing 92 percent of the time. But in their approach to the scene they were terrible, scoring just 13 percent. That was the problem. They didn't take the necessary steps to steer clear of temporary autism. And when Dade County zeroed in on improving what officers did *before they encountered the suspect*, the number of complaints against officers and the number of injuries to officers and civilians plummeted. "You don't want to put



yourself in a position where the only way you have to defend yourself is to shoot someone," Fyfe says. "If you have to rely on your reflexes, someone is going to get hurt — and get hurt unnecessarily. If you take advantage of intelligence and cover, you will almost never have to make an instinctive decision."

## 7. *"Something in My Mind Just Told Me I Didn't Have to Shoot Yet"*

What is valuable about Fyfe's diagnosis is how it turns the usual discussion of police shootings on its head. The critics of police conduct invariably focus on the intentions of individual officers. They talk about racism and conscious bias. The defenders of the police, on the other hand, invariably take refuge in what Fyfe calls the split-second syndrome: An officer goes to the scene as quickly as possible. He sees the bad guy. There is no time for thought. He acts. That scenario requires that mistakes be accepted as unavoidable. In the end, both of these perspectives are defeatist. They accept as a given the fact that once any critical incident is in motion, there is nothing that can be done to stop or control it. And when our instinctive reactions are involved, that view is all too common. But that assumption is wrong. Our unconscious thinking is, in one critical respect, no different from our conscious thinking: in both, we are able to develop our rapid decision making with training and experience.

Are extreme arousal and mind-blindness inevitable under conditions of stress? Of course not. De Becker,

whose firm provides security for public figures, puts his bodyguards through a program of what he calls stress inoculation. "In our test, the principal [the person being guarded] says, 'Come here, I hear a noise,' and as you come around the corner — boom! — you get shot. It's not with a real gun. The round is a plastic marking capsule, but you *feel* it. And then you have to continue to function. Then we say, 'You've got to do it again,' and this time, we shoot you as you are coming into the house. By the fourth or fifth time you get shot in simulation, you're okay." De Becker does a similar exercise where his trainees are required to repeatedly confront a ferocious dog. "In the beginning, their heart rate is 175. They can't see straight. Then the second or third time, it's 120, and then it's 110, and they can function." That kind of training, conducted over and over again, in combination with real-world experience, fundamentally changes the way a police officer reacts to a violent encounter.

Mind reading, as well, is an ability that improves with practice. Silvan Tomkins, maybe the greatest mind reader of them all, was compulsive about practicing. He took a sabbatical from Princeton when his son Mark was born and stayed in his house at the Jersey Shore, staring into his son's face long and hard, picking up the patterns of emotion — the cycles of interest, joy, sadness, and anger — that flash across an infant's face in the first few months of life. He put together a library of thousands of photographs of human faces in every conceivable expression and taught himself the logic of the furrows and the wrinkles and the creases, the subtle differences between the pre-smile and the pre-cry face.



Paul Ekman has developed a number of simple tests of people's mind-reading abilities; in one, he plays a short clip of a dozen or so people claiming to have done something that they either have or haven't actually done, and the test taker's task is to figure out who is lying. The tests are surprisingly difficult. Most people come out right at the level of chance. But who does well? People who have practiced. Stroke victims who have lost the ability to speak, for example, are virtuosos, because their infirmity has forced them to become far more sensitive to the information written on people's faces. People who have had highly abusive childhoods also do well; like stroke victims, they've had to practice the difficult art of reading minds, in their case the minds of alcoholic or violent parents. Ekman actually runs seminars for law-enforcement agencies in which he teaches people how to improve their mind-reading skills. With even half an hour of practice, he says, people can become adept at picking up micro-expressions. "I have a training tape, and people love it," Ekman says. "They start it, and they can't see any of these expressions. Thirty-five minutes later, they can see them all. What that says is that this is an accessible skill."

In one of David Klinger's interviews, he talks to a veteran police officer who had been in violent situations many times in his career and who had on many occasions been forced to read the minds of others in moments of stress. The officer's account is a beautiful example of how a high-stress moment — in the right hands — can be utterly transformed: It was dusk. He was chasing a group of three teenaged gang members. One jumped the fence, the second ran in front of the car, and the third stood

stock-still before him, frozen in the light, no more than ten feet away. "As I was getting out of the passenger side," the officer remembers, the kid:

> started digging in his waistband with his right hand. Then I could see that he was reaching into his crotch area, then that he was trying to reach toward his left thigh area, as if he was trying to grab something that was falling down his pants leg.
>
> He was starting to turn around toward me as he was fishing around in his pants. He was looking right at me and I was telling him not to move: "Stop! Don't move! Don't move! Don't move!" My partner was yelling at him too: "Stop! Stop! Stop!" As I was giving him commands, I drew my revolver. When I got about five feet from the guy, he came up with a chrome .25 auto. Then, as soon as his hand reached his center stomach area, he dropped the gun right on the sidewalk. We took him into custody, and that was that.
>
> I think the only reason I didn't shoot him was his age. He was fourteen, looked like he was nine. If he was an adult I think I probably would have shot him. I sure perceived the threat of that gun. I could see it clearly, that it was chrome and that it had pearl grips on it. But I knew that I had the drop on him, and I wanted to give him just a little more benefit of a doubt because he was so young looking. I think the fact that I was an experienced officer had a lot to do with my decision. I could see a lot of fear in his face, which I also perceived in other situations, and that led me to believe that if I would just give him just a little bit more time that he might give me an option to not shoot him. The bottom line was that I was looking at



> him, looking at what was coming out of his pants leg, identifying it as a gun, seeing where that muzzle was gonna go when it came up. If his hand would've come out a little higher from his waistband, if the gun had just cleared his stomach area a little bit more, to where I would have seen that muzzle walk my way, it would've been over with. But the barrel never came up, and something in my mind just told me I didn't have to shoot yet.

How long was this encounter? Two seconds? One and a half seconds? But look at how the officer's experience and skill allowed him to stretch out that fraction of time, to slow the situation down, to keep gathering information until the last possible moment. He watches the gun come out. He sees the pearly grip. He tracks the direction of the muzzle. He waits for the kid to decide whether to pull the gun up or simply to drop it — and all the while, even as he tracks the progress of the gun, he is also watching the kid's face, to see whether he is dangerous or simply frightened. Is there a more beautiful example of a snap judgment? This is the gift of training and expertise — the ability to extract an enormous amount of meaningful information from the very thinnest slice of experience. To a novice, that incident would have gone by in a blur. But it wasn't a blur at all. Every moment — every blink — is composed of a series of discrete moving parts, and every one of those parts offers an opportunity for intervention, for reform, and for correction.

## 8. *Tragedy on Wheeler Avenue*

So there they were: Sean Carroll, Ed McMellon, Richard Murphy, and Ken Boss. It was late. They were in the South Bronx. They saw a young black man, and he seemed to be behaving oddly. They were driving past, so they couldn't see him well, but right away they began to construct a system to explain his behavior. He's not a big man, for instance. He's quite small. "What does small mean? It means he's got a gun," says de Becker, imagining what flashed through their minds. "He's out there alone. At twelve-thirty in the morning. In this lousy neighborhood. Alone. A black guy. He's got a gun; otherwise he wouldn't be there. And he's little, to boot. Where's he getting the balls to stand out there in the middle of the night? He's got a gun. That's the story you tell yourself." They back the car up. Carroll said later he was "amazed" that Diallo was still standing there. Don't bad guys run at the sight of a car full of police officers? Carroll and McMellon get out of the car. McMellon calls out, "Police. Can we have a word?" Diallo pauses. He is terrified, of course, and his terror is written all over his face. Two towering white men, utterly out of place in that neighborhood and at that time of night, have confronted him. But the mind-reading moment is lost because Diallo turns and runs back into the building. Now it's a pursuit, and Carroll and McMellon are not experienced officers like the officer who watched the pearl-handled revolver rise toward him. They are raw. They are new to the Bronx and new to the Street Crime Unit and new to the unimaginable stresses of chasing what they think is an armed man down a darkened hallway. Their



heart rates soar. Their attention narrows. Wheeler Avenue is an old part of the Bronx. The sidewalk is flush with the curb, and Diallo's apartment building is flush with the sidewalk, separated by just a four-step stoop. There is no white space here. When they step out of the squad car and stand on the street, McMellon and Carroll are no more than ten or fifteen feet from Diallo. Now Diallo runs. It's a chase! Carroll and McMellon were just a little aroused before. What is their heart rate now? 175? 200? Diallo is now inside the vestibule, up against the inner door of his building. He twists his body sideways and digs at something in his pocket. Carroll and McMellon have neither cover nor concealment: there is no car door pillar to shield them, to allow them to slow the moment down. They are in the line of fire, and what Carroll sees is Diallo's hand and the tip of something black. As it happens, it is a wallet. But Diallo is black, and it's late, and it's the South Bronx, and time is being measured now in milliseconds, and under those circumstances we know that wallets invariably look like guns. Diallo's face might tell him something different, but Carroll isn't looking at Diallo's face — and even if he were, it isn't clear that he would understand what he saw there. He's not mind-reading now. He's effectively autistic. He's locked in on whatever it is coming out of Diallo's pocket, just as Peter was locked in on the light switch in George and Martha's kissing scene. Carroll yells out, "He's got a gun!" And he starts firing. McMellon falls backward and starts firing — and a man falling backward in combination with the report of a gun seems like it can mean only one thing. *He's been shot.* So Carroll keeps firing, and McMellon sees Carroll firing, so he keeps firing,

and Boss and Murphy see Carroll and McMellon firing, so they jump out of the car and start firing, too. The papers the next day will make much of the fact that forty-one bullets were fired, but the truth is that four people with semi-automatic pistols can fire forty-one bullets in about two and a half seconds. The entire incident, in fact, from start to finish, was probably over in less time than it has taken you to read this paragraph. But packed inside those few seconds were enough steps and decisions to fill a lifetime. Carroll and McMellon call out to Diallo. *One thousand and one.* He turns back into the house. *One thousand and two.* They run after him, across the sidewalk and up the steps. *One thousand and three.* Diallo is in the hallway, tugging at something in his pocket. *One thousand and four.* Carroll yells out, "He's got a gun!" The shooting starts. *One thousand and five. One thousand and six.* Bang! Bang! Bang! *One thousand and seven.* Silence. Boss runs up to Diallo, looks down at the floor, and yells out, "Where's the fucking gun?" and then runs up the street toward Westchester Avenue, because he has lost track in the shouting and the shooting of where he is. Carroll sits down on the steps next to Diallo's bullet-ridden body and starts to cry.

# *Conclusion*
# *Listening with Your Eyes: The Lessons of* Blink

At the beginning of her career as a professional musician, Abbie Conant was in Italy, playing trombone for the Royal Opera of Turin. This was in 1980. That summer, she applied for eleven openings for various orchestra jobs throughout Europe. She got one response: The Munich Philharmonic Orchestra. "Dear Herr Abbie Conant," the letter began. In retrospect, that mistake should have tripped every alarm bell in Conant's mind.

The audition was held in the Deutsches Museum in Munich, since the orchestra's cultural center was still under construction. There were thirty-three candidates, and each played behind a screen, making them invisible to the selection committee. Screened auditions were rare in Europe at that time. But one of the applicants was the son of someone in one of the Munich orchestras, so, for the sake of fairness, the Philharmonic decided to make the first round of auditions blind. Conant was number sixteen. She played Ferdinand David's Konzertino for Trombone,