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# A Lion in the Undergrowth

By ANTHONY GOTTLIEB

## THE TELL-TALE BRAIN

### A Neuroscientist's Quest for What Makes Us Human

By V. S. Ramachandran

Illustrated. 357 pp.  
W. W. Norton & Company. \$26.95.

The men of old, reported Socrates, saw madness as a gift that provides knowledge or inspiration. "It was when they were mad that the prophetess at Delphi and the priestesses at Dodona achieved so much; . . . when sane they did little or nothing." Today, insanity can still bring the gift of knowledge, but in a different manner. Much of what we know about the brain comes from seeing what happens when it is damaged, or affected in unusual ways. If

the Delphic seer were to turn up tomorrow, neuroscientists would whisk her straight off into a brain scanner.

V. S. Ramachandran, a professor of neuroscience and psychology at the University of California, San Diego, has done as much as anyone to reveal the workings of the mind through the malfunctions of the brain. We meet some mighty strange malfunctions in his new book, "The Tell-Tale Brain: A Neuroscientist's Quest for What Makes Us Human." There is a man who, after a head injury, cannot recognize or respond to people when he sees them, but can happily chat on the phone. We meet a woman who laughs when she should be yelping in pain. There are patients with Capgras syndrome, who come to believe that

people who are close to them (or, in one case, the patient's poodle) are imposters. We meet unfortunates with an intense desire to have their own healthy limbs amputated, others who are paralyzed on one side but insist against all evidence that they are not, and, in Cotard's syndrome, people who sincerely believe they are dead.

Ramachandran weaves such tales together to build a picture of the specialized areas of the brain and the pathways between them, drawing his map by relating particular types of damage to their corresponding mental deficits. A recurring theme is the way in which many delusions appear to result from the brain trying to make sense of signals that have gone haywire. For example, in the case of a young man who awoke from a coma after a car crash believing that his mother was an imposter, Ramachandran believes that there was damage to a neural route that takes visual information to his amygdala (a part of the brain involved in investing objects with emotional significance). As a result, he suggests, the sight of the young man's mother did not produce its usual emotional buzz, and his brain coped with this anomaly by rationalizing it as the presence of someone who looked like his mother but was in fact not her.

Ramachandran's main thesis, though he often strays from it, is that networks of brain cells known as mirror neurons, which were discovered in monkeys in the late 1990s, played a uniquely important part in human evolution. These cells appear to become active in a creature's brain not only when certain actions are performed by the creature itself but also when the creature observes its fellows performing the same actions. Ramachandran believes that mirror neurons somehow enable us to understand the minds of others, to learn by imitation and to feel empathy, and are perhaps involved in

self-awareness. Some dramatic surge in the development of mirror neurons, he argues, explains the birth of distinctively human mental abilities and culture about 150,000 years ago. He also suggests that autism involves some defect in the functioning of mirror neurons.

Much of “The Tell-Tale Brain,” however, is a general tour of neuroscience. There are lively treatments of three areas in which Ramachandran has himself done pioneering work: visual perception, pain in amputated “phantom” limbs, and synesthesia — a family of benign syndromes in which the senses become commingled, as when, for example, letters and numbers that are printed in black and white are perceived as colored. Ramachandran explains how some brains may develop this ability (which seems to be more common among artists than in the general population), and explores its possible connection to the ability to understand metaphor.

There is an intriguing discussion of what Ramachandran calls the “peekaboo principle” — the idea that you can sometimes make something more pleasing by rendering it less visible. He notes that “we prefer this sort of concealment because we are hard-wired to love solving puzzles, and perception is more like puzzle-solving than most people realize.” This, in his view, helps to explain why the sight of a partially clothed person is “often” more attractive than the sight of a completely naked one. But how “often” is this actually true? And if we love solving perceptual puzzles so much, how come we don’t *always* prefer such concealment? Straight adult males, for example, do not always prefer a picture of a woman in a skimpy bikini to a topless shot. And since they do not always prefer it, how can Ramachandran’s theory be what explains the cases in which they do? (There is perhaps room here for some fruitful scientific cooperation between

Playboy Enterprises and Ramachandran's lab.) A similar problem arises with the ingenious theory Ramachandran offers to account for the appeal of abstract art, which he links to the hard-wired appeal of "ultranormal stimuli." Since people do not in fact universally prefer abstract to representational art, the theory appears to explain either too much or too little.

Because Ramachandran is an exceptionally inventive researcher who tosses off suggestions at a dizzying pace, readers may sometimes lose track of what is firmly established, what is tentative and what is way out there. His fondness for evolutionary explanations can be particularly freewheeling. For example, he relates the color-matching of clothing and accessories to the experiences of our ancestors when they spotted a lion in the undergrowth by realizing that those yellow patches in between the leaves are parts of a single dangerous object. One wonders if there really is much solid evidence for this charming piece of historical reconstruction, and why, if it is correct, people don't run away screaming when approached by women with matching shoes and handbags.

Although Ramachandran admits that his account of the significance of mirror neurons is speculative, he doesn't let on just how controversial it is. In the past four years, a spate of studies has dented every part of the mirror-neuron story. Doubt has been cast on the idea that imitation and the understanding of actions depend on mirror neurons, and on the theory that autism involves a defect in these systems of cells. It has even been claimed that the techniques used to detect the activity of mirror neurons have been widely misinterpreted. Ramachandran may have good reason to discount these skeptical studies, but he surely should have mentioned them.

Even if mirror neurons turn out not to be quite as important as Ramachandran thinks — he has elsewhere predicted that they will do for psychology what DNA did for biology — the book is packed with other evidence that neuroscience has made illuminating progress in recent years. Reading such accounts of exactly what our brains get up to is apt to leave one with the disconcerting thought that they are often a lot cleverer than their owners realize.

*Anthony Gottlieb is the author of “The Dream of Reason: A History of Philosophy From the Greeks to the Renaissance.”*