Amid the squawks and pings of our digital devices, the old-fashioned virtues of reading novels can seem faded, even futile. But new support for the value of fiction is arriving from an unexpected quarter: neuroscience

Brain scans are revealing what happens in our heads when we read a detailed description, an evocative metaphor or an emotional exchange between characters. Stories, this research is showing, stimulate the brain and even change how we act in life.

Researchers have long known that the “classical” language regions, like Broca’s area and Wernicke’s area, are involved in how the brain interprets written words. What scientists have come to realize in the last few years is that narratives activate many other parts of our brains as well, suggesting why the experience of reading can feel so alive. Words like “lavender,” “cinnamon” and “soap,” for example, elicit a response not only from the language-processing areas of our brains, but also those devoted to dealing with smells.

In a 2006 study published in the journal NeuroImage, researchers in Spain asked participants to read words with strong odor associations, along with neutral words, while their brains were being scanned by a functional magnetic resonance imaging (fMRI) machine. When subjects looked at the Spanish words for “perfume” and “coffee,” their primary olfactory cortex lit up; when they saw the words that mean “chair” and “key,” this region remained dark. The way the brain handles metaphors has also received extensive study; some scientists have contended that figures of speech like “a rough day” are so familiar that they are treated simply as words and no more. Last month, however, a team of researchers from Emory University reported in Brain & Language that when subjects in their laboratory read a metaphor involving texture, the sensory cortex, responsible for perceiving texture through touch, became active. Metaphors like “The singer had a velvet voice” and “He had leathery hands” roused the sensory cortex, while phrases matched for meaning, like “The singer had a pleasing voice” and “He had strong hands,” did not.

Researchers have discovered that words describing motion also stimulate regions of the brain distinct from language-processing areas. In a study led by the cognitive scientist Véronique Boulenger, of the Laboratory of Language Dynamics in France, the brains of participants were scanned as they read sentences like “John grasped the object” and “Pablo kicked the ball.” The scans revealed activity in the motor cortex, which coordinates the body’s movements. What’s more, this activity was concentrated in one part of the motor cortex when the movement described was arm-related and in another part when the movement concerned the leg.

The brain, it seems, does not make much of a distinction between reading about an experience and encountering it in real life; in each case, the same neurological regions are stimulated. Keith Oatley, an emeritus professor of cognitive psychology at the University of Toronto (and a published novelist), has proposed that reading produces a vivid simulation of reality, one that "runs on minds of readers just as computer simulations run on computers." Fiction — with its redolent details, imaginative metaphors and attentive descriptions of people and their actions — offers an especially rich replica. Indeed, in one respect novels go beyond simulating reality to give readers an experience unavailable off the page: the opportunity to enter fully into other people's thoughts and feelings.

The novel, of course, is an unequaled medium for the exploration of human social and emotional life. And there is evidence that just as the brain responds to depictions of smells and textures and movements as if they were the real thing, so it treats the interactions among fictional characters as something like real-life social encounters.

Raymond Mar, a psychologist at York University in Canada, performed an analysis of 86 fMRI studies, published last year in the Annual Review of Psychology, and concluded that there was substantial overlap in the brain networks used to understand stories and the networks used to navigate interactions with other individuals — in particular, interactions in which we're trying to figure out the thoughts and feelings of others. Scientists call this capacity of the brain to construct a map of other people's intentions "theory of mind." Narratives offer a unique opportunity to engage this capacity, as we identify with characters' longings and frustrations, guess at their hidden motives and track their encounters with friends and enemies, neighbors and lovers.

It is an exercise that hones our real-life social skills, another body of research suggests. Dr. Oatley and Dr. Mar, in collaboration with several other scientists, reported in two studies, published in 2006 and 2009, that individuals who frequently read fiction seem to be better able to understand other people, empathize with them and see the world from their perspective. This relationship persisted even after the researchers accounted for the possibility that more empathetic individuals might prefer reading novels. A 2010 study by Dr. Mar found a similar result in preschool-age children: the more stories they had read to them, the keener their theory of mind — an effect that was also produced by watching movies but, curiously, not by watching television. (Dr. Mar has conjectured that because children often watch TV alone, but go to the movies with their parents, they may experience more "parent-children conversations about mental states" when it comes to films.)

Fiction, Dr. Oatley notes, “is a particularly useful simulation because negotiating the social world effectively is extremely tricky, requiring us to weigh up myriad interacting instances of cause and effect. Just as computer simulations can help us get to grips with complex problems such as flying a plane or forecasting the weather, so novels, stories and dramas can help us understand the complexities of social life.”

These findings will affirm the experience of readers who have felt illuminated and instructed by a novel, who have found themselves comparing a plucky young woman to Elizabeth Bennet or a tiresome pedant to Edward Casaubon. Reading great literature, it has long been averred, enlarges and improves us as human beings. Brain science shows this claim is truer than we imagined.

Annie Murphy Paul is the author, most recently, of “Origins: How the Nine Months Before Birth Shape the Rest of Our Lives.”

**A version of this op-ed appeared in print on March 18, 2012, on page SR6 of the New York edition with the headline: Your Brain on Fiction.**