



OPINION

Your Brain on Fiction

By ANNIE MURPHY PAUL
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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.

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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.

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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

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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 unequalled 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.

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

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