

Reading a novel triggers lasting changes in the brain

Written by Marie Ellis

Lovers of literature can rejoice: a new study combines the humanities and neuroscience to take a look at what effects reading a novel can have on the brain. Researchers say exploring a book can not only change your perspective, but also it can change your mind - at least for a few days.

The researchers, from Emory University in Atlanta, GA, published their findings in the journal *Brain Connectivity*.

Neuroscientist Gregory Berns, lead author and director of Emory's Center for Neuropolicy, says:

"Stories shape our lives and in some cases help define a person. We want to understand how stories get into your brain, and what they do to it."

To investigate the inner workings of the novel-reading mind, the researchers recruited 21 undergraduates from Emory, who were instructed to read a thriller written by Robert Harris in 2003, titled *Pompeii*.

Based on the real-life eruption of Mount Vesuvius in ancient Italy, Berns explains that the narrative "follows a [fictional] protagonist, who is outside the city of Pompeii and notices steam and strange things happening around the volcano."

While the protagonist tries to save the woman he loves back in Pompeii, the volcano continues to erupt, and meanwhile others in the city do not recognize the signs, Berns says.

"It was important to us that the book had a strong narrative line," he explains, so that the study participants would read a book with an intriguing plot.

Changes in language and sensory motor brain regions

After performing fMRI scans, researchers found that reading a novel causes lasting effects in regions of the brain responsible for language receptivity and for making sensory representations of the body.

For 19 days in a row, the study participants were analyzed by the researchers. For the first 5 days, the investigators performed base-line functional magnetic resonance imaging (fMRI) scans on the students' brains while they were in a resting state.

Then, over the course of 9 days, the students read specific portions of the novel until they completed it. Instructed to read each assigned part in the evening, the students came back to the researchers in the morning.

In true college undergraduate style, they had to take a quiz in order to prove they had completed the assigned reading, after which, they again underwent an fMRI scan during a non-reading, resting state.

After completion of the novel, the students then returned for 5 additional days, during which they again underwent scans while in a resting state.

On the mornings after the reading sessions, the researchers observed heightened connectivity in the left temporal cortex, which is an area of the brain linked to receptivity for language.

Berns explains that this heightened connectivity remained, even though the students were not reading the book while they were being scanned.

"We call that a 'shadow activity,' almost like a muscle memory," he says.

The investigators also noticed heightened connectivity in an area of the brain known as the central sulcus. This is a main sensory motor region of the brain, which is associated with making representations of sensation for the body.

They explain that, for example, when we merely think about running, we can activate neurons in the brain that are associated with the actual physical motion of running.

Neural changes are not just instant reactions

Berns says their findings "suggest that reading a novel can transport you into the body of the protagonist." He adds:

"We already knew that good stories can put you in someone else's shoes in a figurative sense. Now we're seeing that something may also be happening biologically."

Interestingly, because the investigators observed these neural changes even 5 days after the students had finished the novel, Berns says the reactions were not simply instantaneous.

Although he says the team is not sure how long these changes last, Berns notes that since they observed them while the students were reading a "randomly assigned novel suggests that your favorite novels could certainly have a bigger and longer-lasting effect on the biology of your brain."

Medical News Today recently reported on a study demonstrating that our brains process visual input that we may never consciously perceive.

Source; <http://www.medicalnewstoday.com/articles/270640.php>