Reading Fiction Improves Brain Connectivity and Function

Reading a novel has the power to reshape your brain and improve theory of mind.
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Neuroscientists have discovered that reading a novel can improve brain function on a variety of levels. The recent study on the brain benefits of reading fiction was conducted at Emory University. The study titled, "Short- and Long-Term Effects of a Novel on Connectivity in the Brain," was recently published in the journal Brain Connectivity.

The researchers found that becoming engrossed in a novel enhances connectivity in the brain and improves brain function. Interestingly, reading fiction was found to improve the reader’s ability to put themselves in another person’s shoes and flex the imagination in a way that is similar to the visualization of a musclememory in sports.

Modern day reading habits continue to evolve in a digital age. Statistics vary on exactly how many people are reading novels this decade compared to decades past. There is a definite trend for general readers to buy more fiction than nonfiction books—and to get facts, news and crystallized knowledge from the internet. In 2012, only four of the top twenty books were nonfiction titles.

"People are interested in escape," says Carol Fitzgerald of the Book Report Network. "In a number of pages, the story will open, evolve and close, and a lot of what's going on in the world today is not like that. You've got this encapsulated escape that you can enjoy."

When Was the Last Time You Read a Good Novel?

Are you someone who likes to read novels? Surprisingly, 42% of college graduates will never read a book again after graduating college. A 2012 "Pew Internet and American Life Project" survey found that people who like to read fiction are driven by personal enrichment and described what they liked about reading saying things like: "I love being exposed to ideas and being able to experience so many times, places, and events." Another person was quoted as saying, "I look at it as a mind stimulant, and it is relaxing." Others expressed the pleasure of living vicariously through a character and having another "life of the mind."

According to the study, reading is a lifestyle choice that is also driven by a desire to unplug from a constant stream of visual information. Readers said things like: "It's better for me to imagine things in my head than watch them on TV. It's an alternate to TV that beats TV every time. ... Reading is better than anything electronic." One respondent captured the general sentiment of avid fiction readers by saying, "I love being able to get outside myself."
One of the benefits of getting outside yourself by putting yourself in someone else's shoes through a novel is that it improves theory of mind. As the father of a 6-year-old, I realize the imaginative and cognitive benefits of children losing themselves in a good story and learning to empathize with a fictional character. Although lots of people are still reading fiction, this new study confirms that people of all ages should be encouraged to increase reading time while striving to reduce TV time.

The average American home has 2.86 TV sets, which is roughly 18% higher than in the year 2000 (2.43 sets per home), and 43% higher than in 1990 (2.0 sets). In America, there are currently more televisions per home than human beings. On average, children under the age of 8 spend over 90 minutes a day watching television or DVDs.

Nearly 33% of American children live in a household where the television is on all or most of the time. Children between the ages 8-18 years old watch an average of three hours of television a day. On average, 61% of children under two use some type of screen technology and 43% watch television every day. This is disturbing to me.

One of the problems of watching television is that it reduces theory of mind. Theory of mind (often abbreviated "ToM") is the ability to attribute mental states—beliefs, intents, desires, pretending, knowledge, etc.—to oneself and others and to understand that others have beliefs, desires, and intentions that are different from one's own.

Unfortunately, television is the least interactive of any new media and is the one most likely to reduce theory of mind. A paper titled “The Relation Between Television Exposure and Theory of Mind Among Preschoolers” was published in November 2013 in the *Journal of Communication*. The researchers found that preschoolers who have a TV in their bedroom and are exposed to more background TV have a weaker understanding of other people’s beliefs and desires, and reduced cognitive development.

### Reading Improves Brain Connectivity

The changes caused by reading a novel were registered in the left temporal cortex, an area of the brain associated with receptivity for language, as well as the the primary sensorimotor region of the brain. Neurons of this region have been associated with tricking the mind into thinking it is doing something it is not, a phenomenon known as grounded, or embodied cognition.

An example of embodied cognition is similar to visualization in sports—just thinking about playing basketball, can activate the neurons associated with the physical act of playing basketball.

“The neural changes that we found associated with physical sensation and movement systems suggest that reading a novel can transport you into the body of the protagonist,” said neuroscientist Professor Gregory S. Berns, lead author of the study. The ability to put yourself in someone else’s shoes improves theory of mind.

“Stories shape our lives and in some cases help define a person,” said Dr. Berns, director of Emory University’s Center for Neuropolicy in Atlanta. He added, “We want to understand how stories get into your brain, and what they do to it.”
The storytelling aspect of a novel is a multi-faceted form of communication that engages a broad range of brain regions. Although several linguistic and literary theories describe what constitutes a story, neurobiological research has just begun to identify the brain networks that are active when processing stories.

Reading improves brain connections in red.

To determine a time frame of which connectivity in the brain lasted the longest, the researchers measured changes in resting-state connectivity before and after reading a novel. The researchers chose a novel over a short story because the length and depth of the novel would allow them to a set of repeated engagements with associated, unique stimuli (sections of the novel) set in a broader, controlled stimulus context that could be consumed between several periods in a brain scan.

The researchers took fMRI scans of the brains of 21 undergraduate students while they rested. Then the students were asked to read sections of the 2003 thriller novel "Pompeii" by Robert Harris over nine nights. The students' brains were scanned each morning following the nightly reading assignment, and then again daily for five days after they had finished the book.

Conclusion: Reading Improves Embodied Cognition and Theory of Mind

The scans revealed heightened connectivity within the students' brains on the mornings following the reading assignments. The areas with enhanced connectivity included the students' left temporal cortex, an area of the brain associated with language comprehension, as well as in the brain's central sulcus, which is associated with sensations and movement.

"The anterior (front) bank of the sulcus contains neurons that control movement of parts of the body," Berns noted. Adding, "The posterior (rear) bank contains neurons that receive sensory input from the parts of the body. Enhanced connectivity here was a surprise finding, but it implies that, perhaps, the act of reading puts the reader in the body of the protagonist."

The ability to put yourself in someone else's shoes through embodied cognition is key to improving theory of mind and also the ability to be compassionate. Although this study does not directly draw these conclusions, it seems like common sense that if we encourage our children to read—as opposed to tuning out through television—theory of mind and the ability to be compassionate to another person's suffering will improve.

Reading a good novel allows your imagination to take flight. Novels allow you to forget about your day-to-day troubles and to transport yourself to a fantasy world that becomes a reality in your mind's eye. Rarely is the movie
adaptation of a book ever quite as good as the original novel. Even the most advanced special effects will always fall short of the visual power of your own imagination.

Berns concluded, "At a minimum, we can say that reading stories—especially those with strong narrative arcs—reconfigures brain networks for at least a few days. It shows how stories can stay with us. This may have profound implications for children and the role of reading in shaping their brains."

Finding a good novel can be tough. I generally only finish about a third of the books I start. Goodreads did a year end ‘Best Fiction of 2013’ reader’s choice awards which has some terrific suggestions for novels that you might enjoy.