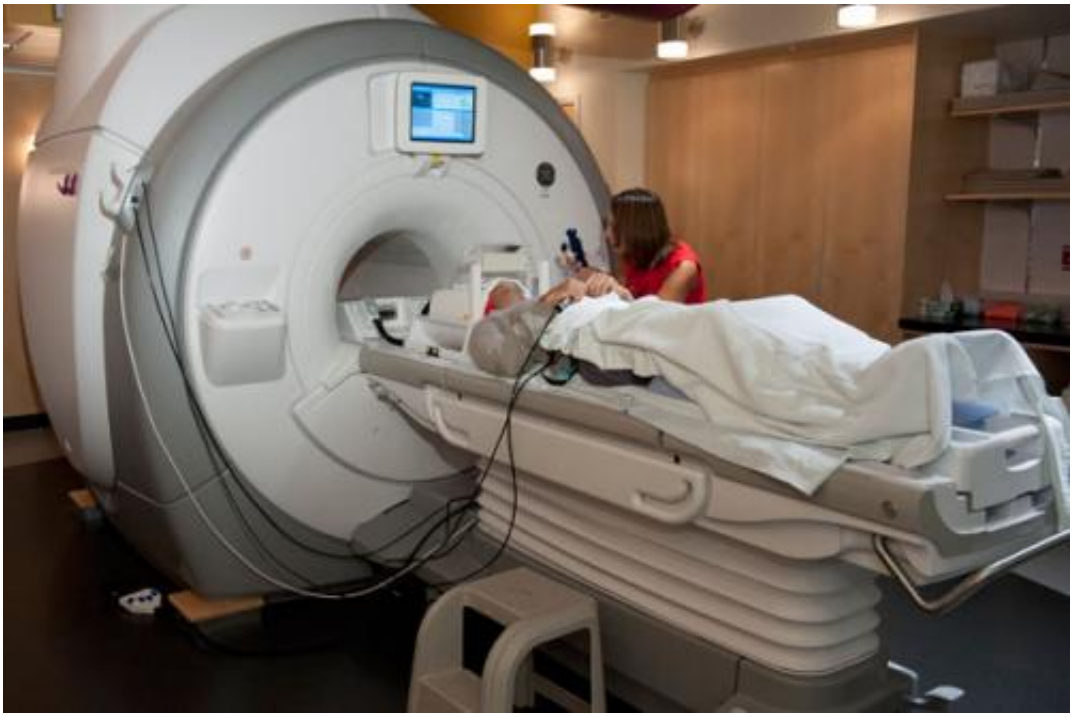
Medical Xpress

The value of literature, now supported by MRI imaging

September 10 2012, by Corrie Goldman



Researcher Natalie Phillips positions an eye-tracking device on Matt Langione. Credit: L.A. Cicero

(Medical Xpress)—The inside of an MRI machine might not seem like the best place to cozy up and concentrate on a good novel, but a team of researchers at Stanford are asking readers to do just that.

In an innovative interdisciplinary study, neurobiological experts,

radiologists and humanities scholars are working together to explore the relationship between reading, attention and distraction – by reading Jane Austen.

Surprising preliminary results reveal a dramatic and unexpected increase in blood flow to regions of the brain beyond those responsible for "executive function," areas which would normally be associated with paying close attention to a task, such as reading, said Natalie Phillips, the literary scholar leading the project.

During a series of ongoing experiments, functional magnetic resonance images track blood flow in the brains of subjects as they read excerpts of a Jane Austen novel. Experiment participants are first asked to leisurely skim a passage as they might do in a bookstore, and then to read more closely, as they would while studying for an exam.

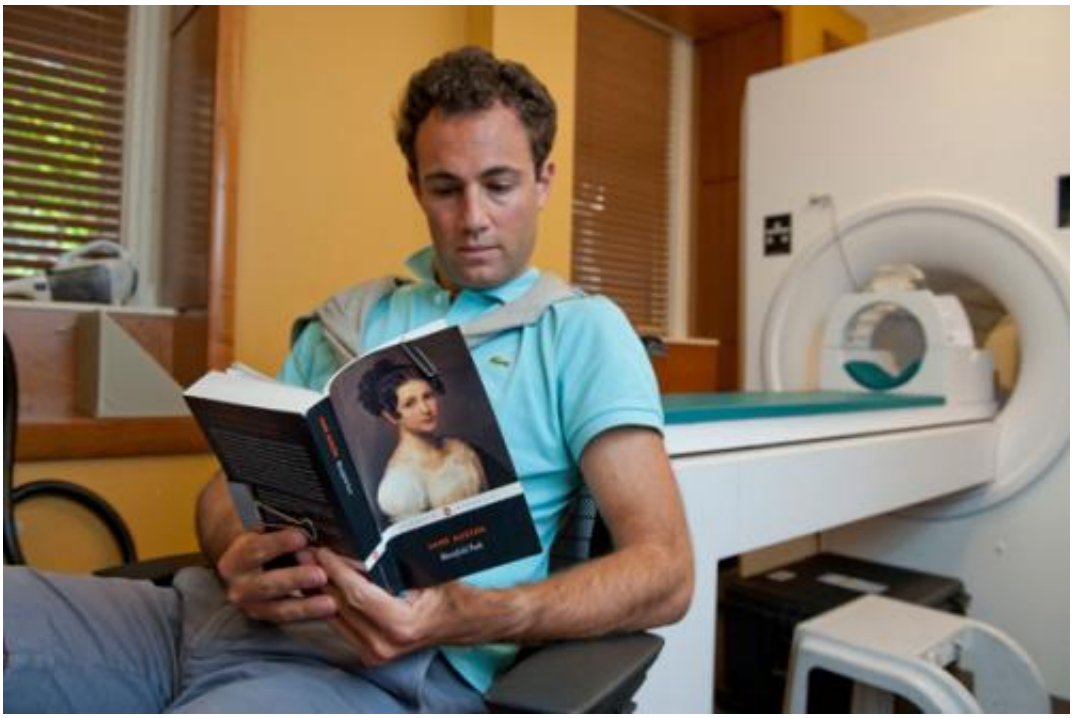
Phillips said the global increase in blood flow during close reading suggests that "paying attention to literary texts requires the coordination of multiple complex cognitive functions." Blood flow also increased during pleasure reading, but in different areas of the brain. Phillips suggested that each style of reading may create distinct patterns in the brain that are "far more complex than just work and play."

The experiment focuses on literary attention, or more specifically, the cognitive dynamics of the different kinds of focus we bring to reading. This experiment grew out of Phillips' ongoing research about Enlightenment writers who were concerned about issues of attention span, or what they called "wandering attention."

Phillips, who received her PhD in English literature at Stanford in 2010, is now an assistant professor of English at Michigan State University. She said one of the primary goals of the research is to investigate the value of studying literature. Beyond producing good writers and thinkers,

she is interested in "how this training engages the brain."

Pioneering in a number of respects, her research is "one of the first fMRI experiments to study how our brains respond to literature," Phillips said, as well as the first to consider "how cognition is shaped not just by what we read, but how we read it."



Test subject Matt Langione, a doctoral candidate at UC-Berkeley, leisurely reads Jane Austen's 'Mansfield Park' in the mock scanning room. The researchers found that blood flow in the brain increases during such leisurely reading, but in different areas of the brain than when the subjects read the novel more closely. Credit: L.A. Cicero

Critical reading of humanities-oriented texts are recognized for fostering analytical thought, but if such results hold across subjects, Phillips said it would suggest "it's not only what we read – but thinking rigorously about

it that's of value, and that literary study provides a truly valuable exercise of people's brains."

Though modern life's cascade of beeps and buzzes certainly prompts a new kind of distraction, Phillips warned against "adopting a kind of historical nostalgia, or assuming those of the 18th century were less distracted than we are today." Many Enlightenment writers, Phillips noted, were concerned about how distracted readers were becoming "amidst the print-overload of 18th-century England."

Rather than seeing the change from the 18th century to today as a historical progression toward increasing distraction, Phillips likes to think of attention in terms of "changing environmental, cultural and cognitive contexts: what someone's used to, what they're trying to pay attention to, where, how, when, for how long, etc."

Ironically, the project was born out of a moment of distraction. While sitting on a discussion panel (which happened to be one of the first on cognitive approaches to literature), Phillips found herself distracted from the talk by the audience's varieties of inattention: "One man was chatting to his neighbor; another person was editing their talk; one guy was looking vaguely out the window; a final had fallen asleep."

The talk inspired Phillips to consider connections between her traditional study of 18th-century literature and a neuroscientific approach to literary analysis. Phillips was especially intrigued by the concept of cognitive flexibility, which she defines as "the ability to focus deeply on one's disciplinary specialty, while also having the capacity to pay attention to many things at once," such as connections between literature, history of mind, philosophy, neuroscience and so on.

Phillips delved into the project during her time as a Mellon Fellow at the Stanford Humanities Center in 2010-11. Her first stop was the Stanford

Center for Cognitive and Neurobiological Imaging (CNI).

Samantha Holdsworth, a research scientist specializing in MRI techniques, recalled an early conversation about the project when two scientists were trying to communicate with three literary scholars: "We were all interested, but working at the edge of our capacity just to understand even 10 percent of what each other were saying."

After working through the challenges of disciplinary lingo, the team devised a truly interdisciplinary experiment. Participants read a full chapter from Mansfield Park, which is projected onto a mirror inside an MRI scanner. Together with a verbal cue, color-coding on the text signals participants to move between two styles of attention: reading for pleasure or reading with a heightened attention to literary form.

The use of the fMRI allows for a dynamic picture of blood flow in the brain, "basically, where neurons are firing, and when," said Phillips. Eye-tracking compatible with fMRI shows how people's eyes move as they read. As Phillips explained, the micro-jumps of the eyes "can be aligned with the temporal blood flow to different regions in the brain."

When participants are done with a chapter, they leave the scanner and write a short literary essay on the sections they analyzed closely. The test subjects, all literary PhD candidates from the Bay Area, were chosen because Phillips felt they could easily alternate between close reading and pleasure reading.

After reviewing early scans, neuroscientist Bob Doherty, director of CNI, said he was impressed by "how the right patterns of ink on a page can create vivid mental imagery and instill powerful emotions." Doherty was also surprised to see how "a simple request to the participants to change their literary attention can have such a big impact on the pattern of activity during reading."

The researchers expected to see pleasure centers activating for the relaxed reading and hypothesized that close reading, as a form of heightened attention, would create more neural activity than pleasure reading. If the ongoing analysis continues to support the initial theory, Phillips said, teaching close reading (i.e., attention to literary form) "could serve – quite literally – as a kind of cognitive training, teaching us to modulate our concentration and use new brain regions as we move flexibly between modes of focus."

With the field of literary neuroscience in its infancy, Phillips said this project is helping to demonstrate the potential that neuroscientific tools have to "give us a bigger, richer picture of how our minds engage with art – or, in our case, of the complex experience we know as literary reading."

Provided by Stanford University

Citation: The value of literature, now supported by MRI imaging (2012, September 10) retrieved 3 May 2024 from https://medicalxpress.com/news/2012-09-literature-mri-imaging.html