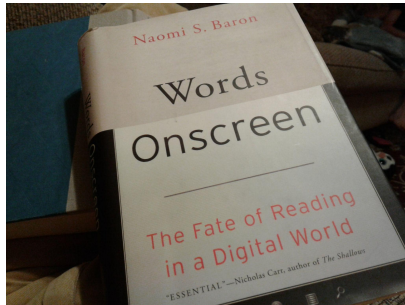


Naomi Baron
Words onscreen

Chapter 8: Your brain on hyper reading



Can we really answer email, watch Netflix, and draft a complicated report at the same time? Might it turn out that today's tech-saturated adolescents actually can successfully juggle tasks that older generations can't?

The mental workings of the brain are now studied in two allied fields: cognitive psychology and neuroscience. What is the difference? Simplistically, cognitive psychology studies the mental functioning of people (say, when you ask them to remember a list of words). Neuroscience looks either at what the brain is physically doing during those cognitive tasks or, as with London taxi drivers or string players, how the brain changes as a result of practice

Maryanne Wolf explains that the human brain was not built for reading. The reading brain does not exist! it's created.

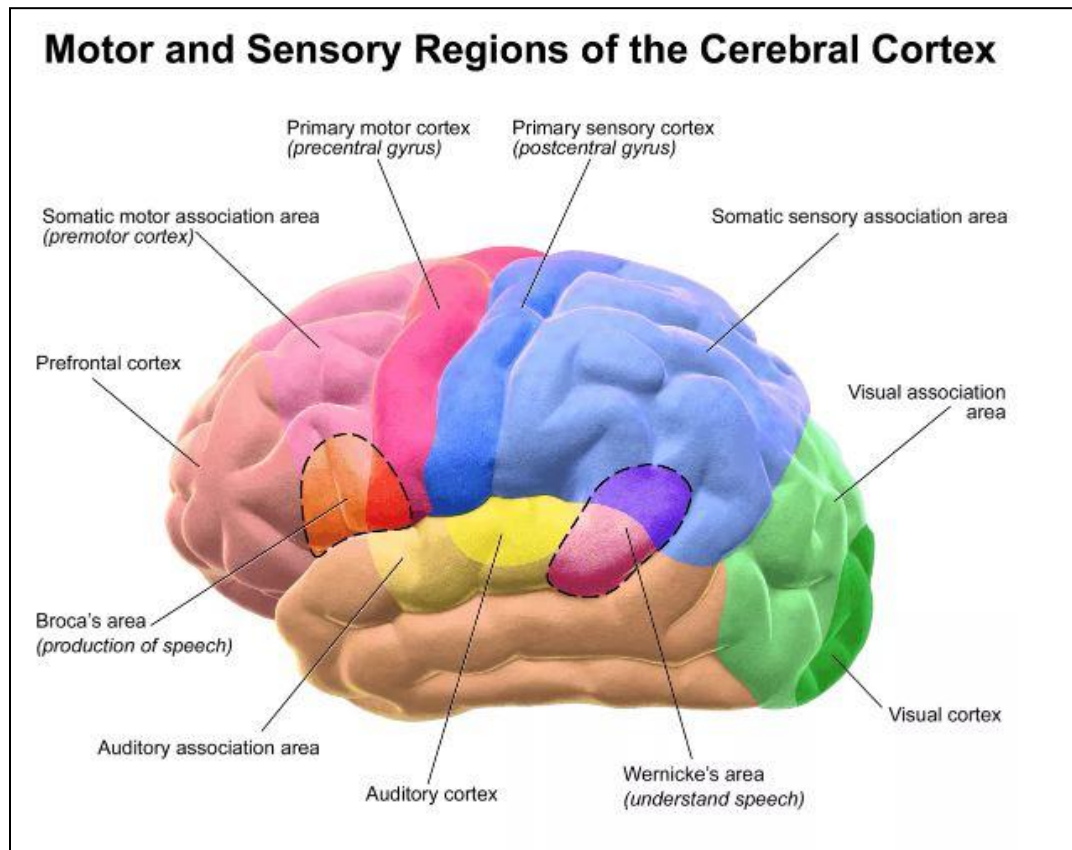
- Reading is not natural.
- We don't have a genetic program for reading.
- We were NOT born to read, but to see, to recognize shapes.

We can learn how to read because our brains are plastic.

We can repurpose neurons and recycle/repurpose areas of our brain to perform the task of reading.

Since the neural tools for reading are cobbled together from structures designed for other purposes, it is not surprising that reading activates areas related to what the text is about. Say you are reading a scene in a novel in which the hero is running to escape the villain. As you read, the motor area of your brain lights up—even though you're curled up in a chair, not moving. Research done at Washington University in St. Louis, using neuroimaging, concluded that readers understand a story by **simulating** the events in the story world and updating their simulation when features of that world change. The link between reading and motor activity extends to clinical areas as well. Researchers have long recognized that children diagnosed with dyslexia also tend to have difficulty with physical coordination.

When we read words like “perfume” or “coffee” or metaphors involving texture such as “He had leathery hands,” the sensory cortex is activated.



There is even evidence that when reading about the lives of others (real or imagined), the brain neurologically registers our attempts to figure out what characters think and feel, and to **identify with them**.

Psychologist Raymond Mar and his colleagues argue that **fiction readers** are better at understanding (and empathizing with) others in real life than those reading little or no fiction.

fMRI (functional magnetic resonance imaging)

Using an fMRI scanner, Natalie Phillips and her colleagues had subjects read a chapter of Jane Austen's novel *Mansfield Park*, with words projected onto a mirror inside the scanner. At various points during the experiment, subjects were instructed either to read for enjoyment or to read in **study mode** (known in the field as “**close reading**”). **Close reading generated** increased blood flow in areas of the brain responsible for executive functions, along with notable brain activity in areas associated with touch and movement.

Susan Greenfield, a professor of pharmacology at the University of Oxford contends that screen culture is shortening our attention span, making us more literal-minded, and reducing opportunities to engage with abstract content. She is also worried that so many fundamental aspects of human communication—eye contact, body language, tone, and bodily contact—are missing from interactions via online social networking or even Zoom (people don't see our hands on Zoom).

Research shows that video games and the internet allow to develop visual intelligence and may enhance speed of mental processing, but they do little for cognitive depth (analysis, critical thinking, and reflection)

- Nicholas Carr's *The Shallows: What the Internet Is Doing to Our Brains* (2011)
- Sherry Turkle's *Alone Together: Why We Expect More from Technology and Less from Each Other* (2012)

These books struck a collective nerve because they argue that certain technologies are making us less human, less attentive, more shallow, more indifferent.

There are scientific studies that confirm these fears. A study at the University of Essex found the mere presence of a mobile phone in the social space where two people were talking led subjects to judge the conversation less close, to assess the relationship as being of lower quality, and to have less empathy for the other person than when researchers instead placed a pocket notebook on the same table. **The mobile phone wasn't turned on**, wasn't vibrating, wasn't beeping. Its sheer physical presence reminded subjects that someone or something else might be waiting to grab their attention. Comparable results have been reported in a subsequent study of similar design.

Do we read web pages? Not really. Jakob Nielsen's research shows we don't. We browse selectively (we frequently use the [F-pattern](#)).

A University College London study analyzing how college professors read on digital screens also found that they do not read; they power browse. Other studies report similar findings. Many experiments have been conducted to compare online reading vs hardcopy. Subjects have frequently reported that their onscreen reading was less in-depth than with hardcopy.

Attention span (p. 165)

A study commissioned by Time Inc., called "A Biometric Day in the Life," found that subjects in their twenties switched media sources 27 times an hour—barely two minutes per landing

How long is your attention span? A 2008 study commissioned in the UK by Lloyds TSB Insurance concluded it averages 5 minutes and 7 seconds—**less than half the amount reported ten years earlier**

To accommodate shrinking attention spans, even commercials are getting shorter, now averaging 15 seconds, down from an earlier 30

Why does an insurance company care about attention? Think of all those claims for water damage from bathtubs left to overflow or fires caused by pans forgotten on the stove

Katherine Hayles (professor of Literature):
contrasts

- Deep attention: entails prolonged concentration and ability to shut out external distractors,
- Hyper attention: involves rapid task switching, desire for a high level of stimulation, and a low threshold for boredom.
Hyper attention can be an efficient strategy for coping with a media-rich world; a strategic response to an information-intensive environment

Hayles is an optimist: “[a] case can be made that hyper attention is more adaptive than deep attention for many situations in contemporary developed societies”

Maryanne Wolf is a bit less optimistic. She wonders whether the time-consuming demands of the deep-reading processes will be lost in a culture whose principal mediums advantage speed, multitasking, and processing the next piece of information. With so much information competing for our attention: readers will have neither the time nor the motivation to think through the possible layers of meaning in what they read.

Anne Mangen is a reading specialist ‘

Her study found better comprehension scores for students who did their reading in print. Why?

Mangen suggests that part of the problem with reading continuous text onscreen (her samples were 1,400–1,600 words long) is difficulty in constructing a mental map of the entire passage. As a result, it is hard to navigate spatially if you want to look back at something you previously read. Navigation is simpler on paper—a point students in my own studies confirmed. One participant in the United States said she likes the fact that with print she can “easily go back to something I’d already read.”

A Japanese student complained that with screens, “it’s not easy to locate where I was.”

Studies also show differences in readers’ level of visual comfort, and screens come out on the short end of the stick. Under controlled testing conditions, subjects had more complaints about blurred vision when reading from a screen than from print. My own studies confirmed that eyestrain and legibility were significant problems with reading digitally.

To recap: Students in my own research strongly preferred reading in print, for both academic work and pleasure. Many parents of young children would rather their children read (or be read to) in print. A sheaf of other reports indicate similar preference for print, even as the volume of eBooks continues to grow.

Hyperlinks enable readers to access related content that resides elsewhere. Initially, that content was somewhere in the same hypertext file (letting you skip from, say, a chapter heading in the Table of Contents directly to the chapter itself). Over time, as the internet grew, links began pointing readers to a wealth of sites elsewhere on the web. An initial motivation for creating hyperlinks was to add interactivity, hopefully making reading more interesting.

Research shows that hypertext tends to make for worse reading performance. The extra decision making and visual processing involved in navigating from link to link increased the cognitive load on readers and may have required working memory capacity that exceeded readers' capabilities.

In the late 1990s, literary scholars such as George Landow encouraged writers to explore the new freedom readers could experience with hypertext, since hyperlinks empowered them to "follow links wherever they please."

Not everyone was as enthusiastic as Landow!

The problem? Hypertext is disruptive.

Jumping about in a text breaks the reader's concentration. Two English professors from the University of Alberta compared how readers approached the hypertext version and the linear version of the same short story. The hypertext readers reported feeling confused. As one subject put it,

The story was very jumpy. I don't know if that was caused by the hypertext, but I made choices and all of a sudden it wasn't flowing properly, it just kind of jumped to a new idea I didn't really follow.

"Jumpy" or "wasn't flowing properly" doesn't make for absorbed reading. If we are distracted from the natural logic of the work itself, it is hard to reflect on what the author is trying to say and construct our own responses, even if only in our mind's eye.

Modern communication technologies beckon us to drop what we are doing, even momentarily, and get sidetracked. Alan Jacobs, writer and literary critic, observed:

I get twitchy within just a few minutes of sitting down with a book. . . . About two years ago, I realized that I was reading fewer books than I had since age ten, and reading them less well—with less attention—and therefore getting less pleasure from reading.

Multitasking (p. 176)

In a digital world with instant access to other people or other places to park your mind, the biggest challenge comes from thinking we can multitask. That we can read (whether for work or pleasure) and at the same time be doing something else.

We go back to the original assumption:

Since the brain is plastic, if we work at it, we can train ourselves to be good multitaskers. Since young people are getting more practice than their parents or grandparents, successive generations should (so the logic goes) be able to handle multiple tasks successfully, including while reading. Is that true?

Experts warn us that successful multitasking is essentially a myth. Nowhere is this myth more ubiquitous and more dangerous than when it comes to driving. Fact: You are 23 times more likely to crash while driving if you are texting than if you're not.

The findings keep pouring in. Research at the University of Utah showed that drivers (again in simulators) who engaged in hands-free phone conversations took longer to react to a car in front of them that was braking than a control group. A second University of Utah study yielded chilling results: Use of mobile phones (both handheld and hands-free) compromised subjects' driving **as much as if they were intoxicated**, with a blood alcohol level of .08 percent.

Marcel Just and his colleagues at Carnegie Mellon University used an fMRI scanner to examine what happens in the brain when subjects are asked to simultaneously drive and comprehend spoken language. It turns out that if you are trying to judge whether sentences are true or false at the same time you're driving, **you pull mental resources away from the driving task**, despite the fact you are not holding a phone and not even conversing. The listening task **reduces** activation in the bilateral parietal and superior extrastriate secondary visual areas (which are associated with driving) by a whopping 37 percent.

Very few of us are as good at doing two things at once as when we perform each task separately. So why do we multitask?

Researchers explain that the human brain seeks novelty. We constantly need new stimuli. Each time we hear our mobile phone or email client ping to say we have a message, our brain delivers a **shot of dopamine**, an addictive neurotransmitter that keeps us returning for more.

As we write for the web, what kind of readers can we expect?