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Science, Tech & Environment

Your paper brain and your Kindle brain aren't the same thing

The Takeaway

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A commuter reads on a Kindle e-reader while riding the subway in Cambridge, Mass. Neuroscience says the way his brain treats reading on the Kindle is different than the way the brain processes the newspaper next to him.

Would you like paper or plasma? That's the question book lovers face now that e-reading has gone mainstream. And, as it turns out, our brains process digital reading very differently.

(This story is based on a radio interview. Listen to the full interview.)

Manoush Zomorodi, managing editor and host of WNYC's New Tech City, recalls a conversation with the Washington Post's Mike Rosenwald, who's researched the effects of reading on a screen. "He found, like I did, that when he sat down to read a book his brain was jumping around on the page. He was skimming and he couldn't just settle down. He was treating a book like he was treating his Twitter feed," she says.

Neuroscience, in fact, has revealed that humans use different parts of the brain when reading from a piece of paper or from a screen. So the more you read on screens, the more your mind shifts towards "non-linear" reading — a practice that involves things like skimming a screen or having your eyes dart around a web page.

"They call it a 'bi-literate' brain," Zoromodi says. "The problem is that many of us have adapted to reading online just too well. And if you don't use the deep reading part of your brain, you lose the deep reading part of your brain."

So what's deep reading? It's the concentrated kind we do when we want to "immerse ourselves in a novel or read a mortgage document," Zoromodi says. And that uses the kind of long-established linear reading you don't typically do on a computer. "Dense text that we really want to understand requires deep reading, and on the internet we don't do that."

Linear reading and digital distractions have caught the attention of academics like Maryanne Wolf, director of the Center for Reading and Language Research at Tufts University.

"I don't worry that we'll become dumb because of the Internet," Wolf says, "but I worry we will not use our most preciously acquired deep reading processes because we're just given too much stimulation. That's, I think, the nub of the problem."

To keep the deep reading part of the brain alive and kicking, Zomorodi says that researchers like Wolf recommend setting aside some time each day to deep read on paper.

And now that children are seemingly growing up with a digital screen in each hand, Wolf says it's also important that teachers and parents make sure kids are taking some time away from scattered reading. Adults need to ensure that children also practice the deeper, slow reading that we associate with books on paper.

"I think the evidence someday will be able to show us that what we're after is a discerning 'bi-literate' brain," Wolf says. "That's going to take some wisdom on our part."

UPDATE 9/22/14: Many of you have asked about the original research in this article. Here are a few resources: Wolf explained her research in an essay for Nieman Reports. Ziming Liu at San Jose State University found that when we read on screens we spend more time browsing[1] and scanning, performing "non-linear reading." For an even deeper read, here's Liu's 2008 book[2] on the subject. Anne Mangen at the University of Norway found that readers retain plot elements better when they read in print instead of on a Kindle[3]. But a study in PLOS[4] found that reading e-ink is a lot like reading on paper in terms of visual fatigue.

This story originally aired on PRI's The Takeaway, a public radio program that invites you to be part of the American conversation.

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[1] Ziming Liu, (2005) "Reading behavior in the digital environment: Changes in reading behavior over the past ten years", Journal of Documentation, Vol. 61 Iss: 6, pp.700 - 712

[2] Ziming Liu, Paper to Digital: Documents in the Information Age. 2008

[3] http://bit.ly/1onFJOL — A. Mangen et al. Mystery story reading in pocket print book and on Kindle: Possible impact on chronological events memory. IGEL 2014. Tourin, Italy.

[4] Benedetto et al E-Readers and Visual Fatigue Plos ONE 2013