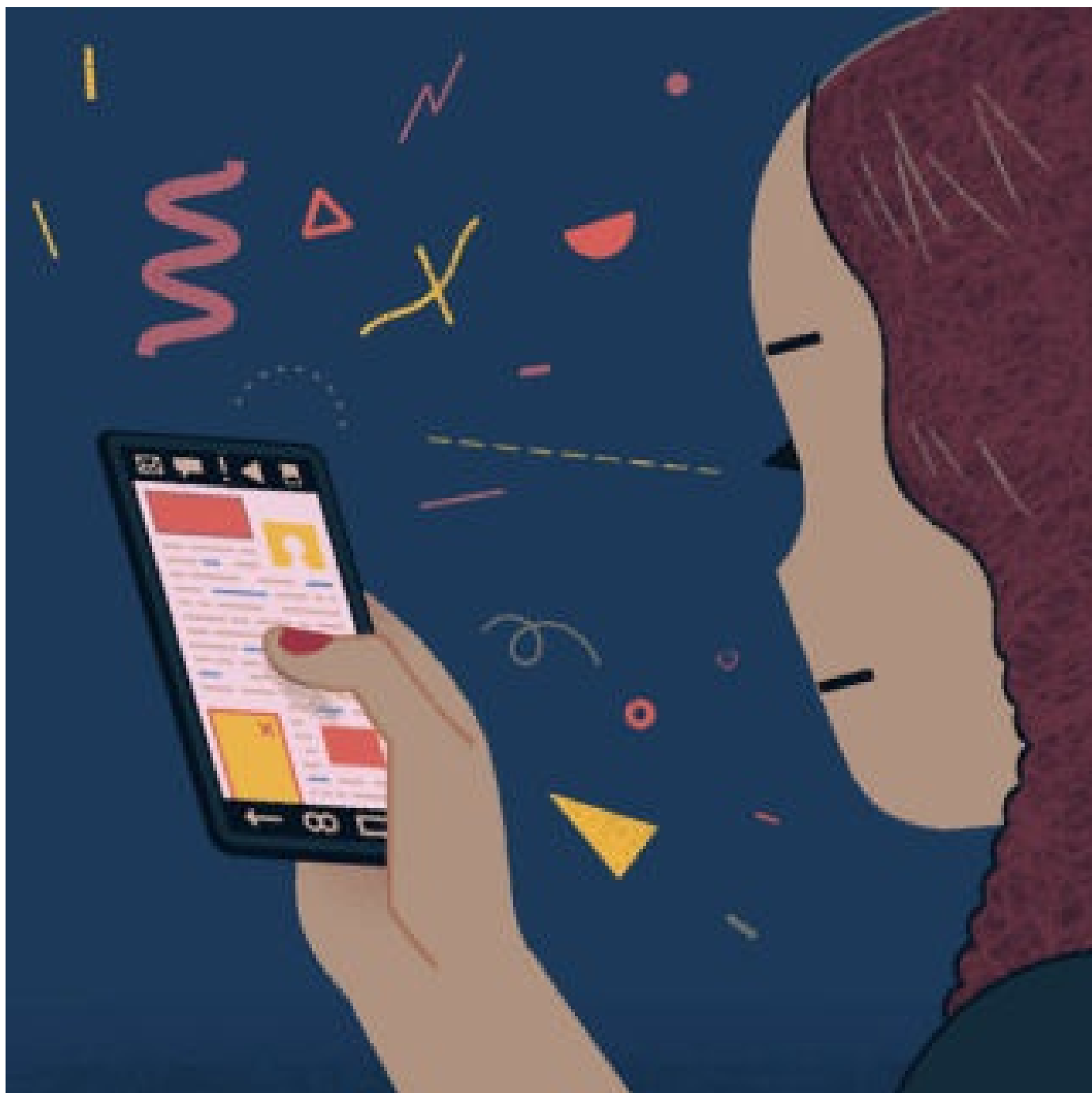


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## BEING A BETTER ONLINE READER

By Maria Konnikova

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Soon after Maryanne Wolf published “Proust and the Squid,” a history of the science and the development of the reading brain from antiquity to the twenty-first century, she began to receive letters from readers. Hundreds of them. While the backgrounds of the writers varied, a theme began to emerge: the more reading moved online, the less students seemed to understand. There were the architects who wrote to her about students who relied so heavily on ready digital information that they were unprepared to address basic problems onsite. There were the neurosurgeons who worried about the “cut-and-paste chart mentality” that their students exhibited, missing crucial details because they failed to delve deeply enough into any one case. And there were, of course, the English teachers who lamented that no one wanted to read Henry James anymore. As the letters continued to pour in, Wolf experienced a growing realization: in the seven years it had taken her to research and write her account, reading had changed profoundly—and the ramifications could be felt far beyond English departments and libraries. She called the rude awakening her “Rip van Winkle moment,” and decided that it was important enough to warrant another book. What was going on with these students and professionals? Was the digital format to blame for their superficial approaches, or was something else at work?

Certainly, as we turn to online reading, the physiology of the reading process itself shifts; we don’t read the same way online as we do on paper. Anne Mangen, a professor at the National Centre for Reading Education and Research at the University of Stavanger, in Norway, points out that reading is always an interaction between a person and a technology, be it a computer or an e-reader or even a bound book. Reading “involves factors not usually acknowledged,” she told me. “The ergonomics, the haptics of the device itself. The tangibility of paper versus the intangibility of something digital.” The contrast of pixels, the layout of the words, the concept of scrolling versus turning a page, the physicality of a book versus the ephemerality of a screen, the ability to hyperlink and move from source to source within seconds online—all these variables translate into a different reading experience.

The screen, for one, seems to encourage more skimming behavior: when we scroll, we tend to read more quickly (and less deeply) than when we move sequentially from page to page. Online, the tendency is compounded as a way of coping with an overload of information. There are so many possible sources, so many pages, so many alternatives to any article or book or document that we read more quickly to compensate. When Ziming Liu, a professor at San Jose State University whose research centers on digital reading and the use of e-books, conducted a review of studies that compared print and digital reading experiences, supplementing their conclusions with his own research, he found that several things had changed. On screen, people tended to browse and scan, to look for keywords, and to read in a less linear, more selective fashion. On the page, they tended to concentrate more on following the text. Skimming, Liu concluded, had become the new reading: the more we read online, the more likely we were to move quickly, without stopping to ponder any one thought.

The online world, too, tends to exhaust our resources more quickly than the page. We become tired from the constant need to filter out hyperlinks and possible distractions. And our eyes themselves may grow fatigued from the constantly shifting screens, layouts, colors, and contrasts, an effect that holds for e-readers as well as computers. Mary Dyson, a psychologist at the University of Reading who studies how we perceive and interact with typography and design online and in print, has found that the layout of a text can have a significant effect on the reading experience. We read more quickly when lines are longer, but only to a point. When lines are too long, it becomes taxing to move your eyes from the end of one to the start of the next. We read more efficiently when text is arranged in a single column rather than multiple columns or sections. The font, color, and size of text can all act in tandem to make our reading experience easier or more difficult. And while these variables surely exist on paper just as they do on-screen, the range of formats and layouts online is far greater than it is in

print. Online, you can find yourself transitioning to entirely new layouts from moment to moment, and, each time you do so, your eyes and your reading approach need to adjust. Each adjustment, in turn, takes mental and physical energy.

The shift from print to digital reading may lead to more than changes in speed and physical processing. It may come at a cost to understanding, analyzing, and evaluating a text. Much of Mangen's research focusses on how the format of reading material may affect not just eye movement or reading strategy but broader processing abilities. One of her main hypotheses is that the physical presence of a book—its heft, its feel, the weight and order of its pages—may have more than a purely emotional or nostalgic significance. People prefer physical books, not out of old-fashioned attachment but because the nature of the object itself has deeper repercussions for reading and comprehension. "Anecdotally, I've heard some say it's like they haven't read anything properly if they've read it on a Kindle. The reading has left more of an ephemeral experience," she told me. Her hunch is that the physicality of a printed page may matter for those reading experiences when you need a firmer grounding in the material. The text you read on a Kindle or computer simply doesn't have the same tangibility.

In new research that she and her colleagues will present for the first time at the upcoming conference of the International Society for the Empirical Study of Literature and Media, in Torino, Italy, Mangen is finding that that may indeed be the case. She, along with her frequent collaborator Jean-Luc Velay, Pascal Robinet, and Gerard Olivier, had students read a short story—Elizabeth George's "Lusting for Jenny, Inverted" (their version, a French translation, was called "Jenny, Mon Amour")—in one of two formats: a pocket paperback or a Kindle e-book. When Mangen tested the readers' comprehension, she found that the medium mattered a lot. When readers were asked to place a series of events from the story in chronological order—a simple plot-reconstruction task, not requiring any deep analysis or critical thinking—those who had read the story in print fared significantly better, making fewer mistakes and recreating an over-all more accurate version of the story. The words looked identical—Kindle e-ink is designed to mimic the printed page—but their physical materiality mattered for basic comprehension.

Wolf's concerns go far beyond simple comprehension. She fears that as we turn to digital formats, we may see a negative effect on the process that she calls deep reading. Deep reading isn't how we approach looking for news or information, or trying to get the gist of something. It's the "sophisticated comprehension processes," as Wolf calls it, that those young architects and doctors were missing. "Reading is a bridge to thought," she says. "And it's that process that I think is the real endangered aspect of reading. In the young, what happens to the formation of the complete reading circuitry? Will it be short-circuited and have less time to develop the deep-reading processes? And in already developed readers like you and me, will those processes atrophy?"

Of course, as Wolf is quick to point out, there's still no longitudinal data about digital reading. As she put it, "We're in a place of apprehension rather than comprehension." And it's quite possible that the apprehension is misplaced: perhaps digital reading isn't worse so much as different than print reading. Julie Coiro, who studies digital reading comprehension in elementary- and middle-school students at the University of Rhode Island, has found that good reading in print doesn't necessarily translate to good reading on-screen. The students do not only differ in their abilities and preferences; they also need different sorts of training to excel at each medium. The online world, she argues, may require students to exercise much greater self-control than a physical book. "In reading on paper, you may have to monitor yourself once, to actually pick up the book," she says. "On the Internet, that monitoring and self-regulation cycle happens again and again. And if you're the kind of person who's naturally good at self-monitoring, you don't have a problem. But if you're a reader who hasn't been trained to pay attention, each time you click a link, you're constructing your own text. And when you're asked comprehension questions, it's like you picked up the wrong book."

Maybe the decline of deep reading isn't due to reading skill atrophy but to the need to develop a very different sort of skill, that of teaching yourself to focus your attention. (Interestingly, Coiro found that gamers were often better online readers: they were more comfortable in the medium and better able to stay on task.) In a study comparing digital and print comprehension of a short nonfiction text, Rakefet Ackerman and Morris Goldsmith found that students fared equally well on a post-reading multiple-choice test when they were given a fixed amount of time to read, but that their digital performance plummeted when they had to regulate their time themselves. The digital deficit, they suggest, isn't a result of the medium as such but rather of a failure of self-knowledge and self-control: we don't realize that digital comprehension may take just as much time as reading a book.

Last year, Patricia Greenfield, a psychologist at the University of California, Los Angeles, and her colleagues found that multitasking while reading on a computer or a tablet slowed readers down, but their comprehension remained unaffected. What did suffer was the quality of a subsequent report that they wrote to synthesize their reading: if they read the original texts on paper or a computer with no Internet access, their end product was superior to that of their Internet-enabled counterparts. If the online readers took notes on paper, however, the negative effects of Internet access were significantly reduced. It wasn't the screen that disrupted the fuller synthesis of deep reading; it was the allure of multitasking on the Internet and a failure to properly mitigate its impact.

Indeed, some data suggest that, in certain environments and on certain types of tasks, we can read equally well in any format. As far back as 1988, the University College of Swansea psychologists David Osborne and Doreen Holton compared text comprehension for reading on different screens and paper formats (dark characters on a light background, or light characters on a dark background), and found no differences in speed and comprehension between the four conditions. Their subjects, of course, didn't have the Internet to distract them. In 2011, Annette Taylor, a psychologist at the University of San Diego, similarly found that students performed equally well on a twenty-question multiple-choice comprehension test whether they had read a chapter on-screen or on paper. Given a second test one week later, the two groups' performances were still indistinguishable. And it's not just reading. Last year, Sigal Eden and Yoram Eshet-Alkalai found no difference in accuracy between students who edited a six-hundred-word paper on the screen and those who worked on paper. Those who edited on-screen did so faster, but their performance didn't suffer.

We need to be aware of the effects of deeper digital immersion, Wolf says, but we should be equally cautious when we draw causal arrows or place blame without adequate longitudinal research. "I'm both the Cassandra and the advocate of digital reading," she says. Maybe her letter writers' students weren't victims of digitization so much as victims of insufficient training—and insufficient care—in the tools of managing a shifting landscape of reading and thinking. Deep-reading skills, Wolf points out, may not be emphasized in schools that conform to the Common Core, for instance, and need to meet certain test-taking reading targets that emphasize gist at the expense of depth. "Physical, tangible books give children a lot of time," she says. "And the digital milieu speeds everything up. So we need to do things much more slowly and gradually than we are." Not only should digital reading be introduced more slowly into the curriculum; it also should be integrated with the more immersive reading skills that deeper comprehension requires.

Wolf is optimistic that we can learn to navigate online reading just as deeply as we once did print—if we go about it with the necessary thoughtfulness. In a new study, the introduction of an interactive annotation component helped improve comprehension and reading strategy use in a group of fifth graders. It turns out that they could read deeply. They just had to be taught how. Wolf is now working on digital apps to train students in the tools of deep reading, to use the digital world to teach the sorts of skills we tend to associate with quiet contemplation and physical volumes. "The same plasticity that allows us to form a reading circuit to

begin with, and short-circuit the development of deep reading if we allow it, also allows us to learn how to duplicate deep reading in a new environment,” she says. “We cannot go backwards. As children move more toward an immersion in digital media, we have to figure out ways to read deeply there.”

Wolf has decided that, despite all of her training in deep reading, she, too, needs some outside help. To finish her book, she has ensconced herself in a small village in France with shaky mobile reception and shakier Internet. Faced with the endless distraction of the digital world, she has chosen to tune out just a bit of it. She’s not going backward; she’s merely adapting.

*Illustration by Sophia Foster-Dimino.*

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