

A Chacun Son

Words Onscreen: The Fate of Reading in a Digital World

By Naomi S. Baron. New York, NY: Oxford University Press, 2015,

Welcome prowlers of digital media:

1. A heads-up on what your search and scan of this book review might deliver.
2. Naomi Baron is critical of reading electronic books and even other text.
3. Her argument for both printed media and that people actually prefer printed books is eclectic but too dependent on introspection and anecdotes.
4. She doesn't consider that the limited experience of the readers with electronic books might be an important factor.
5. More digital experience and advances in technology and human computer interaction will likely favor electronic media.
6. Her advocacy of continuous reading might offer a memorable artistic experience but might not be conducive to comprehension, learning, and memory.

Welcome continuous readers:

My dear reader, what medium are you using to read this book review? Are you paired with this physical journal in a library (yes Martha, libraries still exist, even some without cafes) or a copy you just received in snail mail? Or did you access the journal and this book review electronically? By now, it appears you are somewhat committed to continue reading this review. What reading strategy are you following and what do you expect to obtain from the review? According to Naomi Baron, the author of *Words On Screen: The Fate of Reading in a Digital World*, reading a book in a digital medium is fundamentally different from reading traditional printed books. She expertly systematizes empirical evidence and speculative discourse to convince us that reading strategy and experience will likely differ for ePaper and printed paper (pPaper) media. Print is more likely to promote continuous linear reading whereas you would be more likely to search and sample from the virtual version.

Are you able to concentrate completely on what I'm saying? Added to the strategy difference, you will also be more vulnerable to extraneous distractions via your device when reading electronically. For Baron, the delivery medium will likely make a difference in your experience, evaluation, and memory of this review, and a book's delivery format will ensure an even larger difference. Given her eclectic survey of the literature, it is surprising that Baron didn't cite Marshall McLuhan's classic aphorism, "The medium is the message". I don't think she would agree with McLuhan's dismay that literacy compromised the native's raw experience of the world. It would be foolish to extend his argument to propose that digital media has also compromised our raw experience of text.

Continuous Reading

Baron tackles the difficult charge of accumulating evidence specifically for corroborating the case for a greater value for printed books compared to electronic books. She proposes two prominent advantages of print: continuous

reading and concentration. Continuous reading is a valuable endeavor. With print, the reader becomes immersed in the book and the characters therein and develops empathy, which of course translates into value for the reader in the real world. Books of serious fiction have high value because they encourage people to empathize with others and develop the skill of empathizing which then will make them better citizens.

About ten percent of continuous reading appears to comprise mind wandering, or mindless reading. We have all experienced becoming aware of being zoned out even though our eyes were moving across the printed page as usual, and that we didn't have the foggiest idea of what we just read (Reichle, Reineberg, & Schooler, 2010). Although arguments have been made for positive features of mind wandering, such as a potential for creative thought, it reveals that continuous reading or printed books might not have as much concentrated attention than previously believed. Perhaps continuous reading along with accompanying mind wandering provides a respite from the data intensive world we live in.

Electronic media, on the other hand, afford the reader to scan the text while perhaps multitasking with other applications on the device such as messaging, email, or angry birds (or whatever app is currently hot). Baron also considers rereading (reading the book again after a first reading) as an advantage of printed books over their electronic counterparts. Rereading a book at another stage in life can give us insights into who we were then and who we are now. I wonder, however, whether a similar understanding might occur in simply reading another book in the same genre of one we've read at an earlier time. Genre would be tightly defined because we cannot expect a reading of King Lear will reflect on our memory of reading of Romeo and Juliet a few decades earlier. We can agree that a goal of voluntary reading affords pleasurable experiences accompanied by valuable memories. An important question is whether continuous reading of print and the accompanying concentration justify a safeguarding of printed books, even in face of the digital age.

It is currently popular to attribute our ease of navigating our world via Bayesian inference and predictive coding (Clark, 2013; Friston, 2010). Bayesian inference heavily weights prior experience, which works well in a fairly constant environment. The fewer surprises we have the better. As stated by Clark (2013, p.195), " We color-code consumer products, we drive on the right (or left), paint white lines on roads, and post prices in supermarkets. At multiple time-scales, and using a wide variety of means (including words, equations, graphs, other agents, pictures, and all the tools of modern consumer electronics) we thus stack the dice so that we can more easily minimize costly prediction errors in an endlessly empowering cascade of contexts from shopping and socializing, to astronomy, philosophy, and logic." Rereading would certainly limit surprises and could conceivably enhance comprehension.

I believe that we all can agree that reading's value is intimately tied to learning. Witness the enormous effort that reading instruction programs place on

comprehension and learning. One might question how Baron's view of concentrated continuous reading optimizes comprehension and learning. In a recent book providing a thorough meta-analysis of learning, Fiorella and Mayer (2015) found eight learning strategies that significantly improve learning and memory. These strategies are summarizing the text; creating maps/organizing the text; drawing based on the text; imagining based on the text; self testing; self explaining; teaching; and enacting the text. All of these depict learning from text as a generative activity; continuous reading would seem to be the antithesis of employing these strategies, unless it were embellished to include them or similar ones.

Much of Baron's evidence for print is derived from preferences derived from various surveys conducted by her and others, spoken and written anecdotes, and casual remarks. These preferences are strong fodder for Baron to justify that printed matter is not losing the battle with electronic text and that printed books will be present for some time. Baron notes these subjective impressions and observations with appropriate caveats about how misleading our introspection's can be, but she fails to emphasize how they usually represent a population with more experience with printed than electronic books. And, of course, for all of us who are old enough to read this review, our experience began solely with print well before electronic text was introduced. A personal anecdote comes to mind. We had a colloquium from a visiting IBM engineer who criticized the scroll mouse (of course this was many years ago). Before he could complete his criticism one of our computer scientists blurted out "I love my scroll mouse." We're not going to debate the value of the scroll mouse but simply to make the point that individual differences are pervasive enough that we could believe they make the world go around. Importantly, our experience in many ways determines partially if not almost completely our preferences. Obviously the computer scientist had mastered the scroll mouse with lots of time on task and it served his purpose very well. Moreover, he might have over-interpreted the value of the mouse itself as opposed to his acquired expertise (which might have been as accomplished with many other input devices).

We aren't surprised that Baron has experienced a greater value of printed matter as opposed to electronic media. This does not mean, however, that there aren't upsides to electronic media that overshadow upsides of printed matter. She has clocked her 5000 hours to become an expert with printed matter. Thus, it might simply mean that Baron has built her expertise embedded in the medium of printed matter and has yet to accomplish that same expertise with electronic material. Achieving expertise with digital texts might make her an advocate of electronic material in the same way that she's an advocate of printed matter.

In the nascent stage of the Cognitive Revolution, Gibson and Levin (1975) devoted a chapter of their classic book *Psychology of Reading* to reading's different purposes. (Relevant to the digital-age discussion, one can purchase this book for 65 cents on Amazon.) To experience a book in the same manner we experience a painting, music, or other form of art, then perhaps continuous

reading of print is the ideal medium. This view probably contrasts with the author's, who cites Vladimir Nabokov,

Curiously enough, one cannot read a book: one can only reread it. A good reader, a major reader, an active and creative reader is a rereader ... When we read a book for the first time the very process of laboriously moving our eyes from left to right, line after line, page after page ... stands between us and artistic appreciation But at a second, or third, or fourth reading we do, in a sense, behave towards a book as we do towards a painting [which we take in with our eyes on first contact]

One can quibble with Nabokov's qualitative distinction between text and paintings. Eye movement recordings, probably not known to Nabokov, reveal parallels between eye movements in reading and those in viewing paintings. In both cases, the viewer makes saccadic eye movements between periods of short fixations. Although our processing of paintings and books might differ, it is unlikely to be due to the laborious movements of the eyes in these two venues. No doubt one could propose that a more elaborate narrative much be constructed in reading text than viewing a painting. On the other hand, the construction of the narrative might be more difficult for the painting because there are fewer constraints in a painting relative to the usually direct input in text.

Baron stumbles a few times by not considering our tunnel vision during reading. She finds value in seeing both pages of an open book simultaneously. It cannot be the printed text we benefit from, however, because we don't see more than about six or eight characters on either side of our fixation point. Baron also puts too much faith in speed-reading. If someone tells you they're speed-reading over a 1000 words a minute, they not reading all the words. Even if we grant a reader four fixations a second and three words per fixation, she is reading 720 words/minute. They use strategies to selectively read "important" information and to organize and remember what they have read. Baron mentions a new technology that can increase you reading speech with no lost of comprehension. This RSVP reading has been pervasive in psycholinguistic experiments for several decades.

As a reviewer, Baron thinks she's doing the author of the submission a disservice by reading the manuscript in electronic form rather than in paper form. This could well be the case but I can promise her that with sufficient time on task and guidance from the applications themselves or colleagues she would find that an electronic paper offers many resources that allow a conscientious and informative review for both the author and the editors. Resources like comments, tracking, and easier access to relevant literature, which I'm confident she uses in her own writing, are just three of the many possibilities that a reviewer can utilize when reviewing a paper.

Baron often fails to temper her criticism of electronic media with its positive

virtues. She finishes a sentence with the foreign phrase *A chacun son*. With the paper version of her book the reader can do one of two things: continue reading without disambiguating the phrase or turn to some electronic device that allows a search for its meaning. On an electronic device, however, most likely a touch will bring up a dictionary or a web search. One of the biggest benefits of electronic books is that you have access to the world's information at your fingertips, which is not possible with a printed book. A reader could always choose to simultaneously read a paper book while connected to a desktop, laptop, or mobile device but this strategy would seem to require too much of a duplication of effort. It probably creates a timesharing or multitasking situation, which is something deemed to be avoided.

Multitasking

I believe Baron's most valid complaint is that we have more difficulty focusing and are much more easily distracted when we're reading electronically than when we're reading in the traditional manner. One cannot deny that if your electronic device is alive to the impulses of the Internet then certainly email and messaging can be disruptive. People have even gone to lengths to use applications that prevent these interruptions or simply turn off outside influences. Certainly, multitasking is something we all do more than we did previously simply because the technology is available to make it possible. Of course we don't want to take on the role of Luddites but there is no doubt that many research findings are substantiating negative consequences of multitasking.

Daniel Levitin (2015), in his recent book, *The Organized Mind*, summarizes some of what the field has found. Although we might have the opposite impression, multitasking is not doing two things at once. At best, we switch from task to task, which is easy to do because the pre-frontal cortex has a novelty bias. Pointedly, multitasking appears to increase the hormones cortisol and adrenaline, which produce stress and overstimulation respectively. Switching among tasks releases a hit of dopamine resulting in a loss of focus. So we should be concerned by the cadre of teenagers busily engrossed with their phones even while sharing a communal space. Even these skilled teens are not good multitaskers, and those who do it most may actually be poorer at it.

The digital world with multiple demands and therefore the need for multitasking is here, however, and for most of us it is necessary to embrace it. Although aware of the negative consequences of multiple simultaneous demands imposed by the digital world, I'm optimistic that we can achieve some level of expertise in the same manner as our computer scientist mastered the scroll mouse. Perhaps 5000 hours of focused practice will achieve the same miracle documented in individual dedicated domains such as chess, music, and sports. Some reasonable guidelines on organization, such as those given by Levitin, can also soften the pressure. As suggested by a reader, the emotional demands imposed by this world can be treated by "therapists, counselors, pastors, alcohol, drugs, pills, life coaches, self-help books, and I've lost track of how many new

religions per day. And many of the afore mentioned remedies are available digitally online!"

Personal Experiences and Preferences

I just like the feel of printed books. I miss the paper while turning the page. I enjoy the smell of paper and ink. These are just a few of many cited answers people give when comparing print and electronic media. I have a fond memory of Bill Estes describing how he remembers exactly how he can find the journal location of a specific article on his bookshelf. Another close friend described the following, "I looked over my collection of books. I don't think any two of them are alike. My original Julian Jaynes hardback is not like any other book I have. Its cover, its font, the binding, the page brightness, and the smell, not to mention the combined impression of these things, are totally unique. I still remember the location on the page where I made initial underlinings and notations. The multi-sensory physicality of that reading is not at all like my memory of reading and annotation of Nabokov's autobiography, "Speak Memory," for example."

Observations such as these are also easy to find but for now we won't find many favoring electronic media. My wife just reported that she loves her iPad with its smelly, feely leather cover. Also, when relaxed in a prone position with a printed book, one side is always more poorly illuminated. But these impressions are not tied to a specific book that was read electronically. How might we design interactions with ebooks that could create similar embodiments found with printed books. We mentioned the ease of highlighting and making comments with ebook. We could embellish these with unique characteristics for each new book by changing the color, size, and font of the text and our comments. In addition, we could call up unique music and eventually with technological innovation add voice narration of the text, our own speech, and smell, touch, and kinesthetic experiences. In the near future, we might have similar wonderful fuzzy feelings about the multisensory experience of electronic media that many readers have about traditional print. In addition, it should enhance memory and learning if we can reinstate the original context (state-dependent retrieval).

A fundamental question is: how do we glean information, knowledge, and expertise from the world around us? YouTube videos have proven to be an excellent source. Who would tackle a household task today such as fixing a leaky sink without first consulting a YouTube video? Tennis, golf, and bowling coaches must be losing students because of the ease of watching a YouTube video lesson in slow motion. No one, let alone Naomi Baron, is going to deny the impact of technology on our lives. All of it may not be for the better but it's difficult for me to even begin to appreciate how representing our words by LEDs is a downside to our traditional media of written material. Of course we will not deny poets and printers their art form in print but it is worth stating that electronic media are evolving not only to represent their art but also to provide novel alternatives of representation. But in terms of the business of day-to-day gleaning of information, knowledge, and expertise, thank you silicon, Internet, and Google

for immersing us in more of this stuff than we can possibly handle. There are no free lunches, however, and these gifts also bear their own set of challenges involved with navigating the digital landscape.

Baron makes use of several informal observations and please allow me the liberty to do the same. The new generation of cognitive scientists being hired in business and academia embody different perspective from our tradition of psychological inquiry. Our new hires in psychology, for example, are telling our building manager to take out the existing bookshelves in their assigned offices because they don't own or buy books. This relates to the title of Baron's second chapter, TL;DR, which means 'too long; didn't read.' We are also well aware of the related opinion, TO,DR, which means 'too old; didn't read.'

It's also the case that there is no reason that you should have more eyestrain with an electronic format than with the physical book. Perhaps in the early electronic reader days such as the early Kindle that required front lighting certainly could be a very bad experience. But now with LED displays, the quality of the visual input is better than what you would get with the physical book. So for example we go to a lot of expense to print books in very large print for seniors and those that are visually impaired when type font size is easily adjusted on an electronic reader.

Baron proposes that it is difficult to devote your attention to a small screen when you can have many possible interruptions. If I can relay a personal anecdote, involving a solo bike ride north from West Palm Beach to an island on the West coast of Florida. I didn't want to carry a big book with me but had to have my iPhone with my cycling app, map, and of course a phone for peace of mind. On my iPhone was the biography of Steve Jobs and when I arrived at my destination, I was able to find a secluded beach and spend a few hours reading the engaging biography by Walter Isaacson.

Perhaps the biggest advantage of electronic media is what it provides for all of us who are necessarily handicapped in different situations. One of my favorite examples involves knowledge of vocabulary, a process central to comprehension. When you're reading electronically it is easy to access the meaning of words that you might not know or don't know. In addition, it is easy to highlight material that you find relevant and that you would want to return to. There are sophisticated search functions that allow you to access particular content, which you cannot do in a physical book.

As a child I thought it would be so cool if you could be automatically given the meaning of an unknown word anytime you heard or saw it in print. I didn't imagine it would be possible but now with electronic media it is as natural being present as it was absent. And of course with respect to the pedagogy of reading there are many applications that help bootstrap children into comprehension of what is being read by providing not only the definitions but elaborate uses of the words and sentences and how it might relate to what they're reading now.

Media and Genre

We have seen that, *ceteris paribus*, there may be no qualitative difference to warrant a distinction between print and electronic media. To extend this thesis, I would make the case that there's nothing sacred about the written language versus the spoken language. I recently made a distinction between formal and informal language; these two forms can be delivered in either media. Table 1 provides a taxonomy revealing the potential independence of language modality (spoken versus written) and formal (non-conversational) versus informal (conversational) dialog. Given that both spoken and written language can be naturally used in most situations, it might be argued that it is the formal versus informal genre of the linguistic occurrence rather than its oral or written medium that is important. Similarly, many comparisons between printed and electronic text might also be reduced to formal and informal language.

	Spoken	Written
Formal	TED talk Lecture MOOC	Book Article Letter
Informal	Face-to-Face- Conversation Spoken Dialog Audio Captioning	Texting Instant Messaging Captioning

Retrospective

Electronic books as well as the electronic world open up a set of new horizons and make the exchange of information, knowledge, and expertise much more accessible. For example one of our book reviewer's quickly retrieved the book once he accepted to review an electronic version of the book. He was able to read the book and initiate a book review very quickly rather than waiting on a hard copy of the book to arrive by snail mail. (Of course, Amazon and Google are developing drone technology to have a physical book delivered almost immediately.) Also he was able to access other important information to facilitate the review, again, something that would not be possible if we were limited to simply the physical material of journals and books and information that would have to be transmitted by so-called snail mail rather than at the speed of light. Most importantly, we were able to make his review public well before its formal publication (Simonton, 2015). Baron will appreciate that this review was made available electronically perhaps a year before its publication in paper form.

The digital age is here and individuals would be advised to embrace it. A counterargument might be, "What's the hurry?" Slow down and smell the roses. In Goethe's reworking of the German legend, Faust mortgaged his soul to the

Devil, Mephistopheles, for unlimited knowledge and worldly pleasures. Are we doomed to make a similar pact to benefit from the impact of technology on our lives?

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