

SOFIE BEIER

HOW MY BRAIN STOPPED READING

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IMAGINE HOW IT WOULD BE TO LOSE YOUR ABILITY

to recognize letters and numbers. From one moment to the next, no longer being able to use your phone, tell time, turn on the TV or read the simplest instructions—having no idea what message the text is trying to communicate; all you can see are rows of black and white abstract forms.

This is what happened to me.

I am a type designer. I design letters for printed material like the text you are reading now. I also work as an academic researcher studying the legibility of typefaces. My work is focused on defining the letter shapes that make the typeface perform the best under various reading conditions. My situation was therefore extraordinarily peculiar and frightening to me.

We know very little about what actually happens in the brain when we read. But a look at the collective results of the various reading studies suggests that a fluent reader is influenced by a range of actions when recognizing a word, the two most dominate of these, each have their

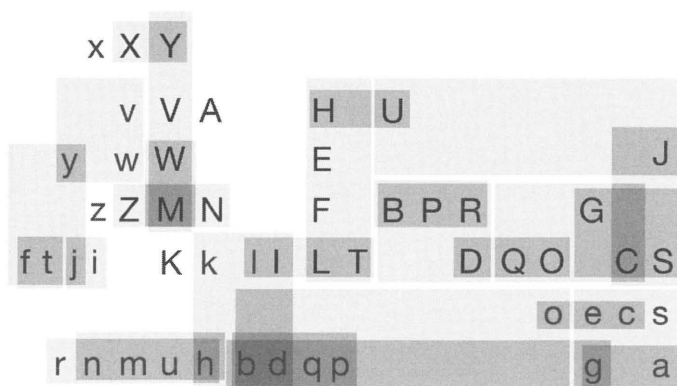


figure 1.

The bottom up operation compares the individual features of the letters and identifies the features that separate one letter from the others.

own outset.

One is a bottom up operation where we identify the individual features of the letters in question. A look at a given word will start a comparison operation on each letter. If the operation identifies a round outer shape, it will exclude the possibility of the target being a letter such as 'l', 'k', 'm'. A lack of

extending elements, will further exclude the possibility of the target being a letter such as 'b,' 'p,' 'q' and 'd,' and so on. Finally the operation will have narrowed the possibilities down to a selection of similar letters such as 'o,' 'c,' and 'e.' When a crossbar in the middle and an open space to the right is identified, we will know that the character in question can only be the letter 'e' (Rayner and Pollatsek, 1989, 11-15).

The second operation is top-down driven. It is a more holistic approach built on a lexical library of syllables and words. Based on the collective material we have read before, the brain quickly runs through all possible combinations (McClelland and Rumelhart, 1981; Paap et al., 1982). The lexical operation is so efficient that you can read a text even when several of the letters are missing or have swapped places (Rayner et al., 2006).

There is more to reading than recognizing words. Another important process is related to our perception of sentences and paragraphs. While reading, the eye does not flow consistently across the text but jumps along in uneven saccadic movements. For the eye to predict where the next break between the jumps should occur, the peripheral area to the right plays a central role. With our consciousness we read the text in focus, however while we do so, the brain also recognizes what happens in the text to the right. This process is quite central in helping us predict what comes next and to act accordingly (O'Regan, 1979; McConkie and Zola, 1984).

figure 2.

Information obtained in the peripheral area of the eye, will dictate where the eye should focus next.



During the birth of my son last year, a case of severe pre-eclampsia affected the area of my brain responsible for processing visual information. The first sign that something had changed came at breakfast time the following morning. When I wanted to make my daily order from the hospital menu card I discovered that I couldn't focus on the text. At first I

discarded this as stress due to my new situation as a mother. But later in the day, when I felt more relaxed and at ease, I realized that the problem had not gone away. I still couldn't read the menu. To my big surprise I found that I could also not write down the food that I wanted to order. The simplest words appeared like alien writing. I went to the bathroom and saw the word 'soap' on a container mounted on the wall, I decided that since I didn't know the letters, this must be Cyrillic or another writing system unfamiliar to me. I then realized that I had also lost parts of my vision, which doctors later identified to be the right peripheral area on both eyes, the area that is so important for the reading and understanding of sentences.

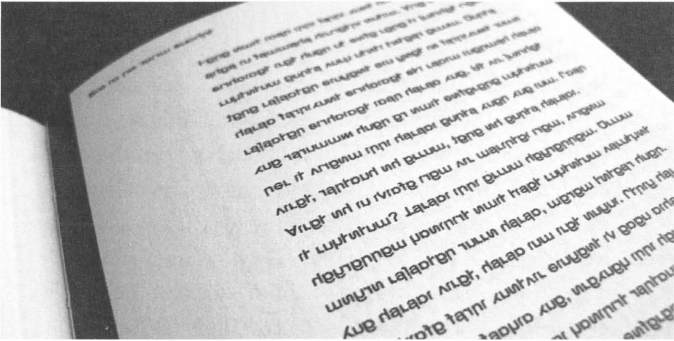


figure 3.
Letters of the Latin
alphabet appeared like
abstract forms to me.

For the first time as an adult, I saw the Latin alphabet as pure shapes without understanding their meaning. It dawned on me that even if this condition were permanent, I would still be able to design letterforms. Although I had lost the skill of writing and understanding each letter of the alphabet, my knowledge of the letter shapes had not disappeared. The pressure in my brain had influenced my mental library for recognizing letters and words, but had no effect on my ability to perceive forms. I could see the objects, but had no knowledge of their name and function.

To my great joy, the condition turned out to be reversible, and my reading and writing skills gradually returned. The first sign indicating that things would come back to normal came after a week or so when I suddenly realized that I

once again could tell the letter names. I was over the moon and eager to start reading again, it was however, not as easy as I had hoped. When I tried to spell my way through words, I couldn't remember the sounds that the different letter combinations make. In other words, the bottom-up operation of connecting parts of the letters had returned to me, however without the lexical information of syllables and words from the top-down operation, I was still incapable of reading anything.

The top-down operation was later to return in various steps. It began with a hunch about the meaning of a couple of words in a newspaper article; I had a feeling I knew the words, I just couldn't tell what sounds the different parts of the words made. The word lexicon had returned before the syllable lexicon, thus indicating that these might actually be two separate processes in the brain.

Eventually the syllable lexicon came back as well. I could read two or three words at a time, but with no peripheral vision to the right, reading sentences was impossible. Without any information about the coming words, my eyes had no idea where to focus next, and I therefore felt completely lost in an orgy of letters and words. Eventually, my full vision came back and two weeks after giving birth my reading skills had returned entirely.

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