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It really is as easy as writing ABC

Most of us take reading and writing completely for granted, no matter what language we use. Once you've learned how to do it, it comes naturally. Now, there's intriguing new research that suggests there's a good reason for that: The symbols used in writing play to the strengths of our brains.

It's always fascinated me that when writing began, about 5,000 years ago, the human brain didn't grow to accommodate these new demands — same old brain, completely novel mode of expression. Most experts think that the earlier invention of language itself required major changes in the brain, but the relatively recent innovation of reading and writing had to make do with the grey matter that was already there.

Now, researchers Shinsuke Shimojo and Mark Changizi of the California Institute of Technology have shown that written languages around the world share some common features that seem to make them easy to read and write.

They analyzed 115 languages for the complexity of their construction, specifically, how many strokes (of a pen) are necessary to make each letter. In upper-case printed English, for instance, A requires three strokes, B also three (two of which are curved), C only one with a curve, and so on. In fact, across those 115 languages, the average number of strokes required for an individual letter is three, while only two are necessary for numbers.

Those figures represent an amazing economy of writing design when you consider that the languages they studied included both living and dead, and ranged from Aramaic through Runic and Tagalog to Etruscan. But Shimojo and Changizi uncovered another curious property of these languages: As simply as these letters are constructed, they have built-in redundancy. Most of them could be recognized from the presence of only two of the three strokes used to make them.

So, what's going on here? The researchers argue that there are

about me



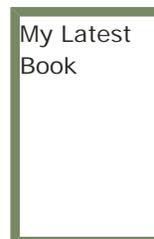
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reasons to believe that it's more important that words be easily read than written.

First, something only has to be written once, but can then be read many times, so the big issue is the perception of the letter, not the printing of it.

Second, handwriting is designed to be easy to produce, but it is usually harder to read.

And finally, even though typewriters and computer keyboards take any challenge there might have been out of printing, their establishment as the primary modes of printing hasn't changed the design of letters appreciably.

The fact that letters have built-in redundancy strengthens the case for the design of letters having been driven by vision, not fine motor control. An extra stroke in a letter here or there reduces the risk of misreading. And the fact letters in languages around the world tend to be composed of three strokes may relate to the fact that three is a threshold number for humans.

You can take in one, two or three objects at a glance without counting them. That process is called subitizing.

All humans, from babies to adults, deal with anything up to three much more easily than they do with larger numbers. It's even been suggested that the reason several numbering systems around the world use straightforward designs for the first three numbers (Roman numerals I, II, III) but then depart from that system after that (IV) is to accommodate our ability to subitize.

A language that uses no more than three strokes per letter will allow its readers to process those strokes and, therefore, each letter immediately, rather than having to take them apart mentally and count the strokes. Shimojo and Changizi even speculate that the shapes of letters have been chosen so that the human visual system can use its already well-developed systems for recognizing objects just from their lines and contours.

It's a beautiful idea: The first scribes designed their letters — unconsciously — to be the kinds of objects that the human brain was already adept at recognizing and understanding. It's at least the partial solution to the puzzle of how a brain could master the challenge of a novel and complex mode of communication.

Psychologists often point out that we are misfits — people with what

are essentially stone-age brains trying to cope with life in the 21st

century. But those old brains can learn new tricks, provided they are cleverly designed.

posted by jay ingram at [1:00 am](#)

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