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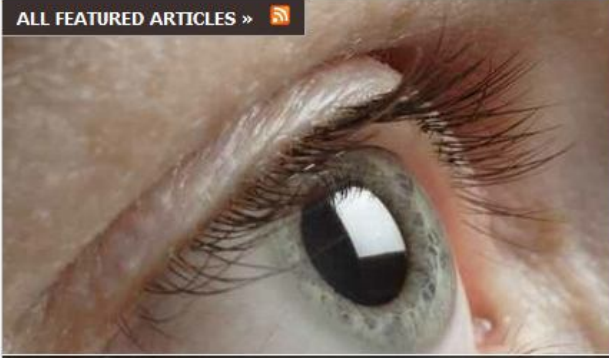


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- ◆ "Hmmm Doug, I think your comment would have been more effective if attached to some other post rather..."
- ◆ "the way you have explained it! its simply great! its not only the content which was truly revolutionary..."
- ◆ "Hi Tommaso, Great quote! I have been reading some of JC Maxwell's original papers. A - He discussed..."
- ◆ "we will onleegetsmarTR ! and itis possible for a HUMAN BEING 2 live without being part of a GROUP..."

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## The Vision Revolution

By Mark Changizi | June 21st 2009 01:00 PM | 1 comment | [Print](#) | [E-mail](#) | [Track Comments](#)
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Your **color vision** is not for seeing red sunsets or green grass; rather, it evolved as a kind of empath sense, optimized to detect the changes in blood physiology in the skin of the faces (and rumps) of others, thereby sensing their emotions.

Your **forward-facing eyes** are not for seeing in depth, but, rather, for significantly enhancing how much you can see in the cluttered forest habitats of your ancestors.

**Perceptual illusions** are not errors your visual system makes in trying to make sense of three-dimensional scenes, but, instead, are due to your brain attempting to foresee the near future, so that by the time the brain generates a perception – which takes a tenth of a second – your perception is of the present.

And you have the **ability to read** not because you're an especially smart ape (no offense), but because writing has culturally evolved to look like nature, just what your ape visual system is good at processing.

My new book, and my column, is about these four stories; about why we see as we do; about our evolutionary origins; about how our visual capabilities mesh with the world around us. It is about the visual powers you never knew you had.

I need to implicitly make a broader point about scientific progress in understanding the brain. Outsiders to the cognitive and brain sciences can sometimes get the impression that we brain scientists have nearly unraveled the riddles of the brain. While it is true that we are making great strides, the real question is, How far away from the finish line are we?

Alas, I believe we are nowhere near the finish line; I put my money on several hundred years of brain-slogging left to go. Keep in mind that your brain is more complicated than the rest of the universe combined (minus all the other brains).

Truth is, relative to what needs to be known, we don't know jack.

The reason we have so much work left is that we're not built like the Arnold Schwarzenegger robot in the "Terminator" movie. Inside the Terminator's body – or at least back in a lab where he was designed and manufactured (by other robots) – there are design specifications indicating what all his parts are for. If the Terminator were to become curious about what one of his brain parts is for, he could just gander at the "user's manual" wherein all his capabilities are enumerated. And many of the Terminator's perceptions have transparent functions, because his perceptions are often explicitly labeled with what they're for (e.g., "body-heat sensing camera activated").

Our brains aren't nearly as scientifically friendly as the Terminator's. Try as you might, you'll find no user's manual in our heads listing our capabilities. You'll just find gray meat of questionable palatability. And when we perceive, we do so without the benefit of internal

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Mark Changizi, PhD, is an assistant professor of cognitive science at Rensselaer Polytechnic Institute. His research areas tend to concern the evolutionary function and design principles governing...

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### WHAT PEOPLE ARE SAYING

"All I know is that I enjoy wearing adult diapers, you have to try it sometime. It's so comforting! ..."

"No, it's not possible for humans to live without the social group. Humans are animals, whether..."

"I thought akgae have low efficiency. If so, can they meet DARPA's high-level needs?..."

"I thought akgae have low efficiency. If so, can they meet DARPA's high-level needs?..."

"I don't have any appropriate training to assess the viability of an aircar -- but I do like the..."



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written labels explaining to us what the perception is for.

Evolution didn't select us to have user-friendly parts; we weren't designed to wear our functions – our powers – on our sleeves. What is missing in our understanding of the brain is this enumeration of our functions. Put simply, we don't even know what we humans can do! And if we don't know our powers, then we don't even know what we need to explain. You can't figure out how the brain carries out X if you don't yet know we can *do* X!

The four stories above are, as I mentioned earlier, about four powers we didn't know we have: color is an empath power like that of the annoying Deanna Troi character in Star Trek; forward-facing eyes gives us a kind of "x-ray vision" power to see much better in cluttered habitats; illusions are the signature of our future-seeing power which allows us to perceive the present; and reading itself is a power, only made possible via a clever strategy culture used to make writing easily absorbable by our illiterate visual system.

These four heretofore undiscovered powers fundamentally change our view about what our brains can do, and consequently lead to fundamental shifts in the questions we must ask about the underpinnings in the brain. But if these fundamental human powers have only recently been uncovered, one can only imagine the teems of powers that are waiting to be discovered!

The brain sciences are filled with brilliant people, but most are not looking to answer such "why" questions. I hope that THE VISION REVOLUTION will excite more people to set their eyes on discovering our enigmatic powers.

Only then will we understand what needs to be explained in the brain, a necessary step toward an eventual "brain revolution."

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#### COMMENTS

Interesting, I have always heard that color vision was an evolutionary adaptation to pick out ripe fruits among the background of greens and yellows found in the canopies that our ape ancestors inhabited.

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Tye (not verified) | 06/21/09 | 18:47 PM

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