Did Humans Evolve to See Things as They Really Are?

Do we perceive reality as it is?

By Michael Shermer | Oct 20, 2015

Izhar Cohen

One of the deepest problems in epistemology is how we know the nature of reality. Over the millennia philosophers have offered many theories, from solipsism (only one's mind is known to exist) to the theory that natural selection shaped our senses to give us an accurate, or verdical, model of the world. Now a new theory by University of California, Irvine, cognitive scientist Donald Hoffman is garnering attention. (Google his scholarly papers and TED talk with more than 1.4 million views.) Grounded in evolutionary psychology, it is called the interface theory of perception (ITP) and argues that percepts act as a species-specific user interface that directs behavior toward survival and reproduction, not truth.

Hoffman's computer analogy is that physical space is like the desktop and that objects in it are like desktop icons, which are produced by the graphical user interface (GUI). Our senses, he says, form a biological user interface—a gooey GUI—between our brain and the outside world, transducing physical stimuli such as photons of light into neural impulses processed by the visual cortex as things in the environment. GUIs are useful because you don't need to know what is inside computers and brains. You just need to know how to interact with the interface well enough to accomplish your task. Adaptive function, not veridical perception, is what is important.

Hoffman's holotype is the Australian jewel beetle *Julodimorpha bakewelli*. Females are large, shiny, brown and dimpled. So, too, are discarded beer bottles dubbed “stubbies,” and males will mount them until they die by heat, starvation or ants. The species was on the brink of extinction because its senses and brain were designed by natural selection not to perceive reality (it's a beer bottle, you idiot!) but to mate with anything big, brown, shiny and dimply.

To test his theory, Hoffman ran thousands of evolutionary computer simulations in which digital organisms whose perceptual systems are tuned exclusively for truth are outcompeted by those tuned solely for fitness. Because natural selection depends only on expected fitness, evolution shaped our sensory systems toward fitter behavior, not

truthful representation.

ITP is well worth serious consideration and testing, but I have my doubts. First, how could a more accurate perception of reality *not* be adaptive? Hoffman's answer is that evolution gave us an interface to hide the underlying reality because, for example, you don't need to know how neurons create images of snakes; you just need to jump out of the way of the snake icon. But how did the icon come to look like a snake in the first place? Natural selection. And why did some nonpoisonous snakes evolve to mimic poisonous species? Because predators avoid *real* poisonous snakes. Mimicry works only if there is an objective reality to mimic.

Hoffman has claimed that "a rock is an interface icon, not a constituent of objective reality." But a real rock chipped into an arrow point and thrown at a four-legged meal works even if you don't know physics and calculus. Is that not veridical perception with adaptive significance?

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As for jewel beetles, stubbies are what ethologists call supernormal stimuli, which mimic objects that organisms evolved to respond to and elicit a stronger response in doing so, such as (for some people) silicone breast implants in women and testosterone-enhanced bodybuilding in men. Supernormal stimuli operate only because evolution designed us to respond to normal stimuli, which must be accurately portrayed by our senses to our brain to work.

Hoffman says that perception is species-specific and that we should take predators seriously but not literally. Yes, a dolphin's icon for "shark" no doubt looks different than a human's, but there really are sharks, and they really do have powerful tails on one end and a mouthful of teeth on the other end, and that is true no matter how your sensory system works.

Also, computer simulations are useful for modeling how evolution might have happened, but a real-world test of ITP would be to determine if most biological sensory interfaces create icons that resemble reality or distort it. I'm betting on reality. Data will tell.

Finally, why present this problem as an either-or choice between fitness and truth? Adaptations depend in large part on a relatively accurate model of reality. The fact that science progresses toward, say, eradicating diseases and landing spacecraft on Mars must mean that our perceptions of reality are growing ever closer to the truth, even if it is with a small "t."

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grhodes October 20, 2015, 7:31 PM

This is a new idea?

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emccray October 25, 2015, 2:45 PM

I agree that evolution ensures that our senses give a true picture of what is really there. Otherwise

we would have had the experience that something was there when it wasn't and visa versa. Imagine being in a jungle and trying to swing on a vine that did not exist.

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timcliffe ➚ **emccray** October 27, 2015, 9:20 AM

Shermer and (emccray) seem likely to be correct - mostly. Our representations of reality probably mirror actual reality pretty well, or those representations wouldn't have kept our ancestors alive.

But there is plenty of evidence that our perceptual system is primed to jump to certain conclusion that go beyond the real information available. Shermer mentions one such situation - the apparently innate tendency (note that I said "tendency") to be hyper-cautious about snakes. This results in people jumping away from sticks, shadows, ripples in the grass. The survival value is obvious -- it's better to avoid a non-existent viper than to blithely step on a real one.

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Boethius ➚ **grhodes** October 27, 2015, 11:02 AM

I don't think so. Kant pretty well owns this idea although Boethius, writing in 524 A.D., said "Everything that is known is comprehended not according to its own nature, but according to the ability to know of those who do the knowing."

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DWillz October 27, 2015, 11:10 AM

"To test his theory, Hoffman ran thousands of evolutionary computer simulations in which digital organisms whose perceptual systems are tuned exclusively for truth are outcompeted by those tuned solely for fitness."

Given that Hoffman's mind also constructs its models of the world representationally, are we to assume he has special access to objective truth and its tell-tale signs? Has he deduced the properties of reality independently of his perceptions? This is no criticism of ITP by the way, it's just that the concepts of 'ultimate' reality, 'objective' reality, and of course 'reality' itself, are troublesome and always seems to raise the spectre of Descartes rationalistic dualism. IOW if ITP is right then metaphysics appears to be key to our 'true' understanding of any quantifiable, qualitative aspect of existence.

IOOW if representational - whence justification for ITP? If rational - then ITP is for the animals but not necessary for us. And if that is the case, given our supreme survival skills, ITP pales before reality-independent thinking, and we veer dangerously close to solipsism.

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Bundulis October 27, 2015, 5:25 PM

Our limited senses and brains cannot perceive and comprehend the full truth about the very complex reality around us. The powerful sensory instruments of modern science go far beyond our senses. Computers help the brain comprehend. Even so, we know very little that is true about dark matter and energy – ~95% of the matter of the universe. We don't know much more about the regulation of gene expression – a recently recognized essential feature of life. Yet, we survive.

Our survival requires that our limited senses and brains be protected from being overwhelmed by too complex "accurate perceptions of reality." A first time visitor will have a hard time finding his way in a city without any help. A simple street map is one possible help. Our knowledge of reality is but a simple map of it. It helps to survive. It does not guarantee survival.

Uldis Blukis

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brerlou October 27, 2015, 7:24 PM

THE BLACK BOX APPROACH

It's very simple. For most automobile drivers the brakes of a car is a rectangular piece of metal hidden under the dashboard. Nothing could be further from the truth. To the car enthusiast or mechanic the brakes are something quite different. So it's all a matter of perspective and

information. I prefer to use the term, "levels of abstraction." Mathematically, and in real life a model is an abstraction from the detailed reality of a dynamic reality. There are different levels and forms of abstraction depending on the pragmatics of the usage to which the abstraction will be applied. The reality is most accurately dealt with in calculus. Calculus does not attempt to deal with the universal whole, which is infinity to all intents and purposes. It simply identifies an arbitrary constant, and attempts to demarcate the unknown, x. in question, with respect to the constant. So we see the world as though we are the constant, and see the various unknowns w.r.t. our selves. In reality however, we have no idea what reality is like. We simply haven't got the equipment needed to perceive it.

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cuthbertbanks ➚ **Boethius** October 27, 2015, 9:33 PM

Why does Kant, or even Boethius, get the credit? The ancient skeptics, e.g. Pyrrho (360-270 BC) and Sextus Empiricus (160-210 AD), philosophized on "appearances" being separate from reality, which sounds exactly the same as Dr. Hoffman's nifty 21st century upgrade.

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beatk November 1, 2015, 1:28 PM

Somewhat related to this, I always wanted to plot my path across the universe. Assuming a hypothetical stationary reference point, in relation to it I travel around the earth axis, the earth travels around the sun, the sun around the center of the milky way galaxy, and the galaxy travels outward with the expansion of the universe. Thus I must be moving on spirals within spirals at pretty good speed, never touching the same place in space again. If someone knows how to calculate and plot this voyage I'd be very interested.

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