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SEARCH

Magic teaches us about human cognition -- UPDATED

POSTED BY [CORY DOCTOROW](#), AUGUST 5, 2008 2:26 AM | [PERMALINK](#)

The Boston Globe's Ideas section covers a paper just published in Nature Neuroscience about the way that magic tricks illuminate the inner workings of human perception -- the paper is co-authored by five magicians, including Teller of Penn and Teller:

"Our picture of the world is kind of a virtual reality," says Ronald A. Rensink, a professor of computer science and psychology at the University of British Columbia and coauthor of a paper on magic and psychology that will be published online this week in Trends in Cognitive Sciences. "It's a form of intelligent hallucination."

The benefit of these sorts of cognitive shortcuts is that they allow us to create a remarkably rich image of our environment despite the fact that our two optic nerves have roughly the resolution of cell-phone cameras. We don't have to, for example, waste time making out every car on the highway to understand that they are, indeed, cars, and to make sense of how they are moving - our minds can simply approximate from the thousands of cars we have already seen in our lives.

But because this method relies so heavily on expectation - not only to fill in the backdrop around us but to determine where to send what psychologists call our "attentional spotlight" - we are especially vulnerable to someone who knows our expectations and can manipulate them, someone like a magician.

"In magic," says Teller, half of the well-known duo Penn & Teller and one of five magicians credited as coauthors of the Nature Reviews Neuroscience paper, "we tend to take the things that make us smart as human beings and turn those against us."

[How magicians control your mind](#) (via [Architectures of Control in Design](#))

Update: Hurray! Nature Neuroscience has [put the whole article online free](#)

posted in: [HAPPY MUTANTS](#), [SCIENCE](#)

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Discussion

#1 POSTED BY [JFRANCHINO](#), AUGUST 5, 2008 2:59 AM

For those who want to look up the paper, it's in Nature Reviews Neuroscience, not Nature Neuroscience. Here's the link: <http://www.nature.com/nrn/journal/vaop/ncurrent/full/nrn2473.html> (subscription required)

#2 POSTED BY [BUGS](#), AUGUST 5, 2008 6:39 AM

JFranchino - Thanks!

Everyone else: it's worth getting the article if you can. It's an academic article so a bit heavy-going in some places if it's not your field, but worth the effort of reading.

#3 POSTED BY [BARDFINN](#), AUGUST 5, 2008 6:39 AM

I think it is incredibly nifty that neuroscience, today, is telling us many of the same things that Eastern mystics and Gautama Buddha told us millennia ago: That our brain lies to us, tricks us, that our brain builds our picture of the world.

I also think it is incredibly nifty that neuroscience today, and science overall, is telling us something in direct contradiction of what eastern mystics and the Gautama Buddha told us millennia ago: That there is a real, external world, that it exists, it is not an hallucination, and that our brain is sometimes accurate enough.

#4 POSTED BY [ODDWORLD](#), AUGUST 5, 2008 7:05 AM

"...our two optic nerves have roughly the resolution of cell-phone cameras."

Popular Photography estimates human eye has approx. 576 MP resolution.

From Pogue's Post a few days ago:

<http://pogue.blogs.nytimes.com/2008/07/29/name-that-camera/>

#5 POSTED BY [DOUGROGERS](#), AUGUST 5, 2008 7:06 AM

Bardfinn, your first paragraph is correct, the second not so much.

Our brain and mind give us our picture of the world, that world does exist, but it is not external to us.

Buddhism doesn't say that the external world doesn't exist.

It says that our senses, perceptions, preconditions and predilections blind us to seeing it as it really is, not that the world is an illusion, but that the world we see is an illusion.

#6 POSTED BY [JEFF](#), AUGUST 5, 2008 7:27 AM

#5, not only does Buddhism teach this, but also psychology (specific and general), Plato or even some schools of magic (occult type). The subjective world is a cooperative creation in part; sometimes we agree to see things as others would like us to because we are inclined towards the consensus reality. I think I'm inclined to distrust consensus reality because I've been trained to be a good scientist. Reminds me of a great book: Prometheus Rising, by the late Great Robert Anton Wilson.

#7 POSTED BY [CHERRY SHIVA](#), AUGUST 5, 2008 8:29 AM

yes, #5dougrogers has a more accurate summary of the historical buddhist view.

furthermore, it's a mistake to generalize about "eastern mystics" - as the more precise aspects of defining reality are actually what separate them, amid well documented debate and differing view.

even within buddhist traditions there are competing schools of thought regarding the nature of reality, but dougrogers' summary is a well framed point of departure.

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that said, i appreciate bardfinn's sentiment - it is interesting and valuable to embrace the notion of simultaneous reality and illusion.

#8 POSTED BY [BARDFINN](#) , [AUGUST 5, 2008 8:49 AM](#)

dougrogers: Indeed. I'm Zen Buddhist - but was an empirical rationalist first, and have struggled with the concepts of Buddhism for a long time. There are indeed many interpretations of the Buddha's expressed ideas, and many of them seem to or do in fact contradict one another.

Otherwise, I wrote "Eastern Mystics" because I wanted a short comment! I've talked with and/or debated ISKCON devotees, Nichiren Buddhists, Tibetan Buddhists, and others who individually deny that an external reality exists, and ISKCON devotees, Nichiren Buddhists, Tibetan Buddhists, and others who individually posit that it might exist but is unknowable, putting forward a philosophy no different from nihilism or solipsism - In pursuit of Buddhist thought, only in Zen and from the Dalai Lama have I seen someone in person or in writing state that it is not only possible but probable and likely that humans can know something accurate about a reality external to their minds without being enlightened - The Dalai Lama nodded to science, and Zen nods to everyday experience.

Goedel and Hofstadter, while they aren't Zen monks nor in an "Eastern" tradition, work in the same cognitive space as those traditions, and they are what I read and worked in first - and they tell me that yes, indeed: much of what we can know is accurate, and help define certain conceptions of limits of what can be known.

There is an often-unknown yogic tradition - *jnana-yoga*, the practice of which is "*neti, neti*" - literally "not this, not this." - a cataloguing of human thought and a pruning off of falsehoods. It is how the historical Gautama Buddha is described as coming to enlightenment, it is utilised by Zen Monks, and I am well-convinced it is the path of Hofstadter, Goedel, Einstein, and other great minds of our time. I practice it because I practice it. It allows me to reconcile rational thought with everyday experience.

#9 POSTED BY [TAKUAN](#) , [AUGUST 5, 2008 9:07 AM](#)

whatever happened to getting old and tired?

#10 POSTED BY [NADRECK](#) , [AUGUST 5, 2008 9:11 AM](#)

"It's a form of intelligent hallucination."

Of course, "hallucination" is a relative term; as is "intelligent". At one end of the spectrum there's schizophrenia wherein there's so much post-production of the optic nerve's input that things like light bulbs turning into swans are seen. Then, a little further over, there's the level of hallucination described in the article. Then, about the same distance over again, there's autism where there's no post-production and things are seen as they are without all this editorial comment spliced in: no foreground, no background, no "attentional spotlight" - everything all at once with equal inherent attentional weight.

To call this difference something that "make us smart as human beings" is more than a little bigoted. I, for one, am sick and tired of being told that I'm not a "human being" by "people" who are blind and deaf and wrapped in cotton batting because they look at the world as if they had toilet paper tubes strapped to their eyes.

It's attitudes like this that are leading to the eugenics programs, euphemistically called "looking for the autism gene", designed to delete everyone from the gene pool that's an inconvenient distance on the hallucination scale towards the autistic end: ie. all of the Asperger's syndrome types that make up most of BB's readership. (Next up, homosexuals? Lefties?)

I would also note that the blindness in perception, particularly the average person's extremely defective ability to detect gradual change, has more serious consequences than getting taken in by magicians. Being obsessed with immediate, quick changes is a hang-over from the cave-man days where all that was important was hearing that cracking twig in the jungle that indicates a sabre-tooth tiger nearby. Not much good in

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a technological society where things like the general trend in average temperatures is what's going to kill you. I, on the other hand, decided 25 years ago not to drive a car because of the screamingly obvious environmental consequences of doing so.

(Well, that and the enormous effort involved in "making out every car on the highway to understand that they are, indeed, cars, and to make sense of how they are moving". ;-)

#11 POSTED BY [DOUGROGERS](#) , AUGUST 5, 2008 9:17 AM

Bardfinn: "others who individually deny that an external reality exists"

That's what the stick is for. And that's what Penn and Teller do - but they affirm for the 'victim" that what the victim thinks is true leaving them to believe in the illusion.

#12 POSTED BY ANONYMOUS , AUGUST 5, 2008 10:38 AM

Oddworld,
the amazing thing is that we use our camera phone eyes to build the 576 MP image in our brains with only the computations of neurons.

#13 POSTED BY [BARDFINN](#) , AUGUST 5, 2008 11:43 AM

I see Penn and Teller as incredibly important: For a few of us, they are the roshi handing out koans that must be cracked.

#14 POSTED BY [GALOOT](#) , AUGUST 5, 2008 10:57 PM

...our two optic nerves have roughly the resolution of cell-phone cameras. *[citation needed]*

No, really. From what ass was that figure pulled?

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