# Magicians, Scientists Team Up To Peek Behind The Illusion

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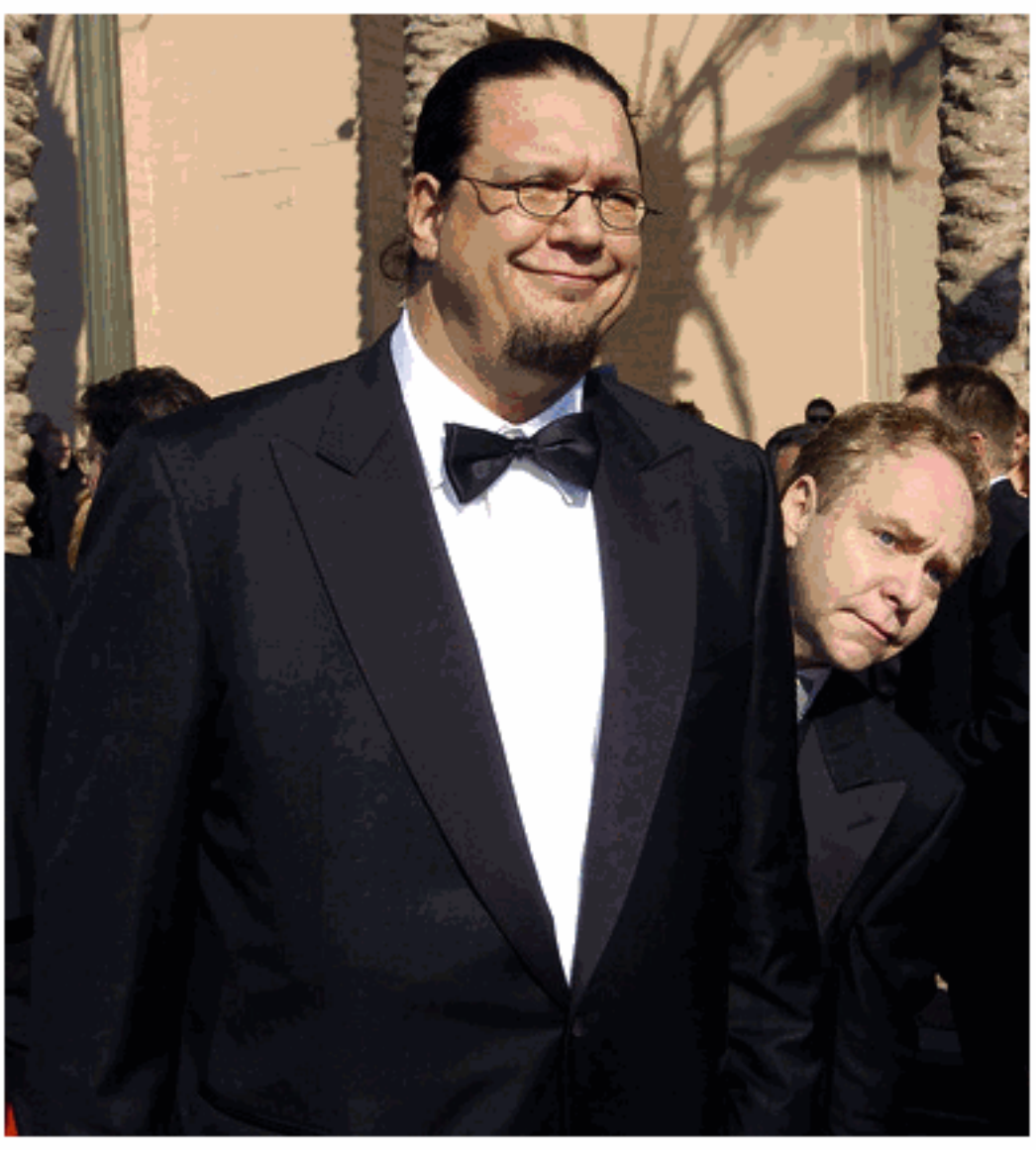
*September 17, 2008*



**Teller, right, of Penn and Teller -- shown in a 2004 photo -- was among the magicians who collaborated with neuroscientists on the paper "Attention and Awareness in Stage Magic: Turning Tricks Into Research." The paper is just one of several recent efforts to explain the mysteries of magic by way of science. (CHRIS PIZZELLO / AP / September 12, 2004)**

Know that old spoon-bending trick magicians are fond of? Want to know how it's done?

It starts with two kinds of neurons in your brain, in the primary visual cortex and the middle temporal visual area. The variations in their responses to oscillating stimuli then lead to spatial mislocalization, causing solid objects to appear to be bending at their center.

It all seems so obvious now.

This, at least, is how a study in a recent issue of the science journal Nature Neuroscience describes the classic illusion. The paper, "Attention and Awareness in Stage Magic: Turning Tricks Into Research," was a collaboration between neuroscientists and magicians, including Teller (of "Penn and Teller" fame) and the Amazing Randi.



It's one of the recent efforts to explain the mysteries of magic by way of science. Once preoccupied with secrecy and mystery, the magic community has opened itself up to academic scrutiny.

The New York Hall of Science just finished its exhibit "The Science of Illusion." And last year, in connection with the Nature paper, the Association for the Scientific Study of Consciousness held a symposium on the "magic of consciousness."

Science can be a dry subject, but combine it with some levitation and mind-reading, and suddenly the laws of physics become crowd-pleasers.

"This has been the biggest summer we've ever had," says Marilyn Hoyt, president and CEO of the New York Hall of Science. "The topic is out there and on the minds of many people."

In hindsight, the mix of science and magic seems a natural. When it comes to behavior and perception, the authors of the Nature Neuroscience paper write, "there are specific cases in which the magician's intuitive knowledge is superior to that of the neuroscientist."

The paper was the idea of Susana Martinez-Conde, director of the Laboratory of Visual Neuroscience in Phoenix. When she contacted the magicians, Martinez-Conde found that many regularly kept up on the latest in cognitive science by reading science magazines. If anything, she says, it was science that needed to catch up on what magicians knew about human perception and awareness.

"I suppose that we had never seen the connections," she says.

But doesn't boiling the most classic tricks down to neuronal phenomena and chemical reactions take some of the mystery out of things? Does it dampen the experience of seeing things float in the air to know that it's all just the work of "mechanistic pathways in the brain that allow magic tricks to work" — as the authors write?

Not at all, says Martinez-Conde. The brain is still among the biggest mysteries of all, so knowing that the "magic" of a trick is actually happening in our own minds doesn't make the illusion any less confounding.

"Part of the entertainment is that the public is trying to figure out how the tricks work," she says. "You try to figure it out and even after you try to reconstruct events."

Having worked with some of the best magicians in the world, she's now well-versed in some of their tricks. But she's impressed every times she sees them.

"It would be impossible for me to perform these tricks because you need so much training," she says.

Since the paper came out, Martinez-Conde says, she has gotten a lot of positive comments from other researchers. As a result, she expects to see more collaborations between scientists and magicians.

But considering that secrets are magicians' bread and butter, one wonders if they worried about giving too much away. After all, great controversies erupt when magicians suspect colleagues of being insufficiently protective of the tricks of the trade.

Magician Mac King, one of the co-authors, said he was intrigued by the idea of a scientist-magician collaboration. After all, they both work along similar principles.

"Magicians are kind of problem-solvers," he says. "There's something that I want to have happen. How do I do it with the means at my disposal?'"

King, his fellow magicians and the neuroscientists met over dinner and hashed out the structure of the paper, with the magicians deciding which facet of magic each wanted to focus on. They went their separate ways, and then the magicians wrote up their notes and submitted them to the science half of the collaboration.

"It was fun; it made me feel like a big-shot academic," says King.

King regularly performs his shows in Las Vegas, and bills his shows "comedy magic." In magic, humor works like a charm. As the paper in Nature Neuroscience notes, "attentional spotlight is put on hold" when the audience is laughing.

But King doesn't fear that the journal is giving too much away.

"I don't think most of my audience is reading Nature, frankly," he says.

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