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Saturday, May 9, 2009

## The neuroscience of magic

An understanding of magic is vital for venturing deep into Fortean realms. However, it is more the stage/street magic variety as opposed to the one that comes with a "k" at the end. This isn't just so you can appreciate that trickery, from slight-of-hand to full blown illusions (that basically come into the territory of [the Big Con](#)), can make the seemingly impossible more than possible. It is also vital as it gives us an insight into how the mind works and how it can trick us into seeing things that aren't there or something that didn't happen the way we thought it did.

[Penn & Teller](#) are Skeptics (with a "K" even if their magic is without one) and like a lot of their brethren can come across a little.. overbearing but they have a lot of insight into how easy the human mind can be bamboozled and are not afraid to whip aside the wizard's curtain to show the mechanics of the trickery, which makes them excellent guides.

To kill some time in a diner, Teller was practicing his version of Cups and Balls, a classic sleight-of-hand trick popularized by ancient Roman conjurers. It involves a series of "vanishes" and "transpositions" as the balls appear and disappear underneath the cups. Teller hadn't brought any props, so he used wadded-up napkins and clear water glasses.

Penn & Teller demonstrate their version of Cups and Balls.

Somehow, this made the trick even better. Although it was now possible to follow the crumpled napkins as Teller variously palmed them, squished them, and moved them from cup to cup, the illusion persisted. "The eye could see the moves, but the mind could not comprehend them," he says. "Giving the trick away gave nothing away, because you still couldn't grasp it."

Here it is (you can stop watching half way through once they've finished the trick for the second time):



It also helps you appreciate the incredible artistry at work too!!

What's surprising is just how limited the repertoire of magical illusions actually is. The Nature Reviews Neuroscience paper lists nine fundamental "conjuring effects" of modern magic, from the vanish and the restoration to telekinesis and ESP. While these basic tricks have been varied endlessly—you can "restore" a cut rope, a sawed-in-half assistant, a shredded piece of paper—each of the effects relies on a specific perceptual phenomenon. This may be why exposing the "secret" of a magic trick is so often deflating. Most of the time, the secret is that we're gullible and our brains are riddled with blind spots.

And what are these seven principles? Well here they are:



However, they are also not afraid to do the science thing, which has helped reveal important information about the way we see the world:

For Teller (that's his full legal name), magic is more than entertainment. He wants his tricks to reveal the everyday fraud of perception so that people become aware of the tension between what is and what seems to be. Our brains don't see everything—the world is too big, too full of stimuli. So the brain takes shortcuts, constructing a picture of reality with relatively simple algorithms for what things are supposed to look like. Magicians capitalize on those rules. "Every time you perform a magic trick, you're engaging in experimental psychology," Teller says. "If the audience asks, 'How the hell did he do that?' then the experiment was successful. I've exploited the efficiencies of your mind."

Now that on-the-job experimentation has taken an academic turn. A couple of years ago, Teller joined a coterie of illusionists and tricksters recruited by Stephen Macknik and Susana Martinez-Conde, researchers at the Barrow Neurological Institute in Phoenix, Arizona, to look at the neuroscience of magic. Last summer, that work culminated in an article for the journal Nature Reviews Neuroscience called "Attention and Awareness in Stage Magic." Teller was one of the coauthors, and its publication was a signal event in a field some researchers are calling magicology, the mining of stage illusions for insights into brain function.

This is important on an awful lot of levels. My angle is the way this slips into preconceived notions about strange phenomena. We have to make decisions on imperfect information and we err on the side of caution - if it looks a bit like a lion and kind of moves like a lion you are better off running rather than waiting around to find out the hard way. Along with all sorts of [heuristics](#) this is also where "beliefs" first kick in filtering the experience but also, importantly, filling in the "gaps". This is the kind of thing I've been thinking about recently - the ETH (as popularly known with flying saucers and alien visitors popping in for tea and anal probes) is ubiquitous in the West (and, increasingly, anywhere with movies and TVs) so if people have an odd encounter with an entity or see a strange object or have even more "out there" experiences they interpret it using their expectations of what is going on and can this can shape their impressions of what happens. As I've said before, the data seems to suggest things aren't so simple. If it looks a bit like a flying saucer and kinda behaves like a flying saucer, doesn't mean it is.

How we interpret and describe strange (and often purely anecdotal) experiences is a complex area and a lot of factors are at work and an understanding of some of the pitfalls could be helpful in finding out what is actually going on. It might not be magick but magic (and magicology) could be one of the keys to help us shed a few of our conceptual chains.

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