Magic and the Brain: Teller Reveals the Neuroscience of Illusion

Penn and Teller Explain Sleight of Hand

One of the first tricks in Penn and Teller's Las Vegas show begins when Teller, like a short, quiet man自愿 associate with an cigarette, inhales, drops it to the floor, and stomps it out. Then he takes another cigarette from his suit pocket and ignites it.

No magic there, right? But then Teller pushes the audience to see him from the other side. He goes through the same set of motions, except this time everything is different: the light of what just transpired, the audience no longer sees him, a character, a calmly orchestrated arch of lies. He doesn't stamp out the first cigarette with the palm of his hand, but puts it in his ear. There is no second cigarette, it's a pencil stub. The smoke from the first bullet's real, but the lighter used on the pencil is actually a flashlight. Yet the illusion is so perfect that every step looks real, even when you've known that it is not.

Penn and Teller demonstrate the oldest basic principles of magic. The trick is called Leek Simple, and the point is that even a puff on a cigarette, closely examined, can disintegrate into smoke and mirrors. “People take you for granted,” Teller says shortly before stepping onto stage. “They usually see only our eyes and have their eyes. But that doesn’t mean it’s simple.”

For Teller (that’s his full legal name), magic is more than entertainment. He wants his tricks to reveal the everyday frauds and misconceptions that people become aware of the illusion in which we see and what seems to be Our brains do see everything the world is too big, too full of stimuli. So the brain takes shortcuts, constructing a picture directly with relatively simple algorithms for what things are supposed to look like. Magicians capitalize on these rules. “Every time you perform a magic trick, you’re engaging in experimental psychology,” Teller says. “If the audience thinks, ‘How the hell did he do that?’ then the trick was successful. I’ve exploited the efficiency of your mind.”

Now that on-the-job training has been taken an academic turn. A couple of years ago, Teller joined a cadre of illusionists and the letters recruited by Kenneth Kranz and Barbara Martinez Conde, researchers at the Barrow Neurological Institute in Phoenix, Arizona, to look at the neuroscience of magic. Last summer, that collaboration 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 mapping of stage illusions for insights into brain function.

“Tricks work only because magicians know, at an intuitive level, how we think,” says Martinez Conde, lead author of the paper. “Even when we know we’re going to be tricked, we still can’t see it, which suggests that magicians are taking the mind at a very deep level.” By reverse-engineering these illusions, Magicians may hope to illuminate the mental loopholes that make us so easy a person to be fooled in half of the time or rabbit appear out off thin air when we know such stuff is impossible. “Magicians are taking advantage of these cognitive illusions long before any scientist identified them,” Martinez Conde says.