Quickies

While a magician works, the mind does the tricks

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Adecent backyard magic show is often an exercise in deliberate chaos. Cards whipped through the air. Glasses crashing to the ground.

Gasps, hand-waving , loud abracadabras. Something's bound to catch fire, too, if the performer is ambitious enough — or needs cover.

"Back in the early days, I always had a little smoke and fire, not only for misdirection but to emphasize that something magic had just happened," said The Great Raguzi, a magician based in Southern California who has performed professionally for more than 35 years, in venues around the world. "But as the magic and magician mature, you see that you don't need the bigger props."

Eye-grabbing distractions — to mask a palmed card or coin, say — are only the crudest ways to exploit brain processes that allow for more subtle manipulations , good magicians learn.

In a paper published last week in the journal Nature Reviews Neuroscience, a team of brain scientists and prominent magicians described how magic tricks, both simple and spectacular , take advantage of glitches in how the brain constructs a model of the outside world from moment to moment, or what we think of as objective reality.

For the magicians, including The Great Tomsoni (John Thompson), Mac King, James Randi, and Teller of Penn and Teller, the collaboration provided scientific validation , as well as a few new ideas.

For the scientists, Susana Martinez-Conde and Stephen Macknik of the Barrow Neurological Institute in Phoenix, it raised hope that magic could accelerate research into perception.

"Here's this art form going back perhaps to ancient Egypt, and basically the neuroscience community had been unaware" of its direct application to the study of perception , Martinez-Conde said.

Some simple magical illusions are due to relatively straightforward biological limitations. Consider spoon bending.

The spoon appears curved, because of cells in the visual cortex called endstopped neurons, which perceive both motion and the boundaries of objects, the authors write.

The end-stopped neurons respond differently from other motion-sensing cells, and this slight differential warps the estimation of where the edges of the spoon are.

The visual cortex is attentive to sudden changes in the environment , both when something new appears and when something disappears, Martinez-Conde said. A sudden disappearance causes what neuroscientists call an afterdischarge : a ghostly image of the object lingers for a moment.

This illusion is behind a spectacular trick by the Great Tomsoni . The magician has an assistant appear on stage in a white dress and tells the audience he will change the color of her dress to red.

He first does this by shining a red light on her, an obvious ploy that he turns into a joke. Then the red light flicks off, the house lights go on and the now the woman is dressed in red.

The secret: In the split-second after the red light goes off, the red image lingers in the audience's brains for about 100 milliseconds, covering the image of the woman. It's enough time for the woman's white dress to be stripped away, revealing a red one underneath.

(Courtesy: NYT NEWS SERVICE)

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