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By Vanessa Schipani

Science and magic

Ladies and gentleman, feast your eyes on the first ever book about the neuroscience of illusion

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For neurobiologists [Stephen Macknik](#) and [Susana Martinez-Conde](#), what happened in Vegas, left Vegas and made it into the pages of their new book *Sleights of Mind*, a 300-page tour through consciousness, attention, and deception via the marriage of professional magic and cognitive neuroscience.

For years, researchers have studied the keen eye of painters to help understand the visual system and perception. But "magicians are artists of cognition," who use attention and awareness as their preferred media rather than paint or clay, says Martinez-Conde.

The idea of "neuromagic," or the neuroscientific study of magic tricks, came to Macknik and Martinez-Conde, neuroscientists at the Barrow Neurological Institute (BNI) in Phoenix, when they were asked to lead the 2007 Association for the Scientific Study of Consciousness (ASSC) annual conference held in Las Vegas, Nevada.

Driving down the strip on their preliminary visit to Las Vegas, magicians were "festooned on billboards, taxicabs, and buses," Macknik and Martinez-Conde write in *Sleights of Minds*, which was co-written with Sandra Blakeslee, *New York Times* science writer. "And then it hit us that these tricksters were like scientists from Bizarro World -- doppelgängers who had outpaced us real scientists in their understanding of attention and awareness and had flippantly applied it to the arts of entertainment, pickpocketing, mentalism and bamboozlement."

One of the major issues when conducting cognitive studies is the test subject's desire to decipher the purpose or end goal of the experiment. This knowledge of the details, false or otherwise, can significantly bias or debase the data, sometimes rendering experiments wastes of time. Magicians, on the other hand, trick their audiences every night. "We wanted to poach their secrets so we can do better experiments," says Macknik.

Macknik and Martinez-Conde, who are married, realized that magicians could not only help them deceive their experimental subjects but could also teach them a thing or two about the field of neuroscience. Apollo, a Las Vegas-based pickpocket magician who steals (and returns) people's watches for a living, gave them insight into the mind's propensity to follow slow, curved movements compared to straight, quick movements, for example. If he wanted to remove someone's watch, Apollo explained, he would make curved movements with his free hand to distract his mark while stealing with his other hand. But if he was to move his free hand in a straight line, the person's attention would snap back to the stealing hand.



Martinez-Conde and Macknik had previously studied the movements of the eyes in these two circumstances, but they had never considered studying attention in this setting. Their interaction with Apollo produced a wealth of for experiments including an investigation into the relationship between attention and specific patterns of eye movements.

Apollo is one of the many magicians that taught them something about how to conduct their research. For the past five years Martinez-Conde and Macknik have travelled around the world from the FISM World Championships of Magic held in Beijing -- where 2300 magicians gather to learn each other's tricks every year -- to Las Vegas, home of Penn & Teller, David Copperfield and Apollo.



Contact juggler at the 24th FISM World Championships of Magic in Beijing.

Video shot by Stephen Macknik

"Experiencing a master magician fling our attention around like a fly fisherman's lure, forcing us to strike at the morsel and then reeling us in, is unlike any other cognitive experience we've had outside of the science we do in our labs," write Macknik and Martinez-Conde in their book. "It's as though somebody took all of the cool things we study everyday and suddenly made them beautiful and dramatic."

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