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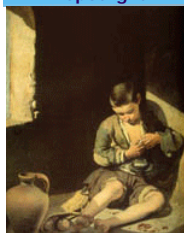
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## Magicians take advantage of the mind's faults

*Benedict Carey*

Magicians alter what the brain perceives by manipulating the way in which it interprets events, stated Bach, "and a long term objective of cognitive psychology would be to predict this numerically".

A decorous magic show is frequently a delivered chaos exercise: cards flying through the air, crystals crashing against the floor, "abracadabra" exclamations at a top volume, or things getting on fire. All because the magician is ambitious, or he needs something to cover him up.

The visual distractions –to cover a card or a coin, for example- are one of the most rough ways to exploit brain processes that allow underlying and imperceptible manipulations.

In an article published last week in the Nature Reviews Neuroscience magazine, a team of neuro-scientists and magicians described the way in which the magic tricks –as much the simple as the spectacular ones- exploit the "technical problems" which has the brain when constructing a model of the exterior world from an instant to the next, or in relation with what we think is objective reality.

To magicians, including The Great Tomsoni (John Thompson), Mac King, Penn and Teller and James Randi, this collaboration meant a scientific vindication, in addition to a way of obtaining new ideas.

To scientists, Susana Martinez-Conde and Stephen Macknik, of the Barrow Institute of Neurology, in Phoenix, this collaboration increased their hopes that magic could accelerate researches about perception.

"Here is this form of art, which perhaps dates from the ancient Egypt, and basically the neuro-scientific community hadn't noticed" its direct application on perception studies, said Martinez-Conde.

"It is a marvellous article", remarked Michael Bach, a scientist of Freiburg University in Germany.

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For example, a theory of perception sustains that the brain constructs the worldly representations moment by moment, using the senses to offer signals which materialize in a mental image based upon experience and context. The brain does this through neuronal tricks: according to neuroscientists by getting closer, cutting out, choosing, instantly and in a subconscious way, what to see and what to let go. Magic evince the "inner seams" of our mind, that is, the stitches.

The visual cortex is attentive to sudden changes in the environment, as much in the instant when something appears as in the one when it disappears, said Martinez-Conde. When something disappears abruptly emerges what neuroscientists call "a post-discharge": an spectral image of the object remains for a while.

This illusion is behind the spectacular magic act of The Great Tomsoni. The magician shows in the stage an assistant dressed in white and tells the audience that he's going to change magically the colour of her dress. The first thing he does is to illuminate the dress with a red light, obvious tactic which he turns into a joke. Then the red light turns off, the lights of the stage are turned on, and now the woman appears with a red dress.

The secret: when the red light disappears, the red image persists in the people's brain for about 100 milliseconds, covering the woman's image... time enough to take the white dress out and reveal a red one she's wearing underneath.

A similar process occurs with cognition. The brain focus itself consciously in a single thing at a time at others expenses, no matter where it's focussing its glance.

In studies with images, neuroscientists found proofs that the brain suppresses the activity around the visual area when it is concentrating in an specific task. Worried by this, the brain may not register in a conscious way the actions that its eyes are looking at. Magicians exploit this in many ways.

In a telephonic interview, Teller explained the way in which a magician is able to get rid of a letter on his right hand by looking quickly for a pencil inside his pockets: "I touch both pockets of the jacket, find the pencil, take it out and give it to someone... the whole act becomes incidental: if the audience is focused in reading the intention –in this case, obtaining the pencil—then the other action disappears and anyone remembers that you placed your hand in the pocket", he said. "You really don't see it because it's no longer a figure, now it became part of the background".

(El Universal, Mexico)

\*Translated by Marilola Castro.

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