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SEARCH

Nature Neuroscience article on neurological basis for magic, co-written by Teller of Penn and Teller

POSTED BY [CORY DOCTOROW](#), AUGUST 5, 2008 7:25 AM | [PERMALINK](#)

Earlier today, I [blogged about an article in Nature Neuroscience](#) about the way that studying stage magic illuminates important facts about neuroscience. I sent an email to Nature Online's Timo Hannay asking him to stick the article outside of Nature's paywall because it seemed so deliciously bloggable -- written as it was by a set of co-authors that included five prominent magicians, including Teller of Penn and Teller. Timo came through, and now the article is downloadable by all and sundry. It's pretty fabulous, too.

Inattentive blindness and change blindness. Attended objects can seem to be more salient or to have higher contrast than unattended objects^{19, 20, 21, 22}. These perceptual effects have well-documented neural correlates in the visual system²³. Magicians use the general term 'misdirection' to refer to the diversion of the spectator's attention away from a secret action. Thus, misdirection can be defined as drawing the audience's attention away from the 'method' (the secret behind the 'effect') and towards the effect (what the spectator perceives)^{7, 24}. Misdirection can be applied in an overt or a covert manner. Here we use the term 'overt misdirection' to indicate cases in which the magician redirects the spectator's gaze away from the method. In the more subtle 'covert misdirection', the magician draws the spectator's attentional spotlight (which can be thought of as the spectator's focus of suspicion) away from the method without redirecting the spectator's gaze. Thus, in covert misdirection the spectators can be looking directly at the method behind the trick and yet be unaware of it because their attention is focused elsewhere.

The concept of covert misdirection is exemplified by the cognitive-neuroscience paradigms of change blindness and inattentive blindness. With change blindness, people fail to notice that something is different from the way it was before. This change can be expected or unexpected, but the key is that it requires the observer to compare the post-change state with the pre-change state. Change-blindness studies have shown that dramatic changes in a visual scene will go unnoticed if they occur during a transient interruption²⁵, such as a blink²⁶, a saccadic eye movement²⁷ or a flicker of the scene^{28, 29, 30, 31}, even when people are looking right at the changes. However, observers can also miss large gradual changes in the absence of interruptions³². A dramatic example of change blindness is illustrated in the Colour-Changing Card Trick video by Richard Wiseman and colleagues (available online at YouTube.com). In this demonstration, the viewers fail to notice colour changes that take place off-camera.

With inattentive blindness, people fail to notice an unexpected object that is fully visible in the display. Thus, inattentive blindness differs from change blindness in that no memory comparison is needed — the missed object is fully visible at a single point in time. In a classic example of inattentive blindness, Simons and Chabris³³ asked observers to count how many times the members of a basketball team passed a ball to one another, while ignoring the passes made by members of a different team. While they concentrated on the counting

task, most observers failed to notice a person wearing a gorilla suit walk across the scene (the gorilla even stops briefly at the centre of the scene and beats its chest!). In this situation no acute interruption or distraction was necessary, as the assigned task of counting passes was absorbing. Further, the observers had to keep their eyes on the scene at all times in order to accurately perform the task. Memmert showed, using eye-tracking recordings, that many observers did not notice the gorilla even when they were looking directly at it³⁴.

[Attention and awareness in stage magic: turning tricks into research](#)

See also:

- * [Magic and Showmanship: Classic book about conjuring has many lessons for writers](#)
- * [Derren Brown's Tricks of the Mind: book explains magic, hypnosis and the rationale for rationalism](#)

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Discussion

#1 POSTED BY [WILLIAMSBK](#) , [AUGUST 5, 2008 8:02 AM](#)

Thanks Cory and Timo. :)

#2 POSTED BY [SECRET LIFE OF PLANTS](#) , [AUGUST 5, 2008 8:22 AM](#)

Just FYI Uri Geller doesn't have a "Discuss" link. You can remove this comment. Ciao.

#3 POSTED BY ANONYMOUS , [AUGUST 5, 2008 8:54 AM](#)

The article is in the journal Nature Reviews Neuroscience (Nature Neuroscience is a different journal).

#4 POSTED BY [SECRET LIFE OF PLANTS](#) , [AUGUST 5, 2008 11:14 AM](#)

Oh, sorry, I guess it is a gadget thing...I never notice that...

#5 POSTED BY [BARDFINN](#) , [AUGUST 5, 2008 11:37 AM](#)

You guys came through with thought-smack. Thanks!

#6 POSTED BY [MARK HURST](#)  , [AUGUST 5, 2008 1:10 PM](#)

You might be interested to read the recent *New Yorker* article on magic called [The Real Work](#).

#7 POSTED BY [BOBKAT](#) , [AUGUST 5, 2008 6:08 PM](#)

Thanx y'all! Can't wait to read it.

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