

# The impulsive brain

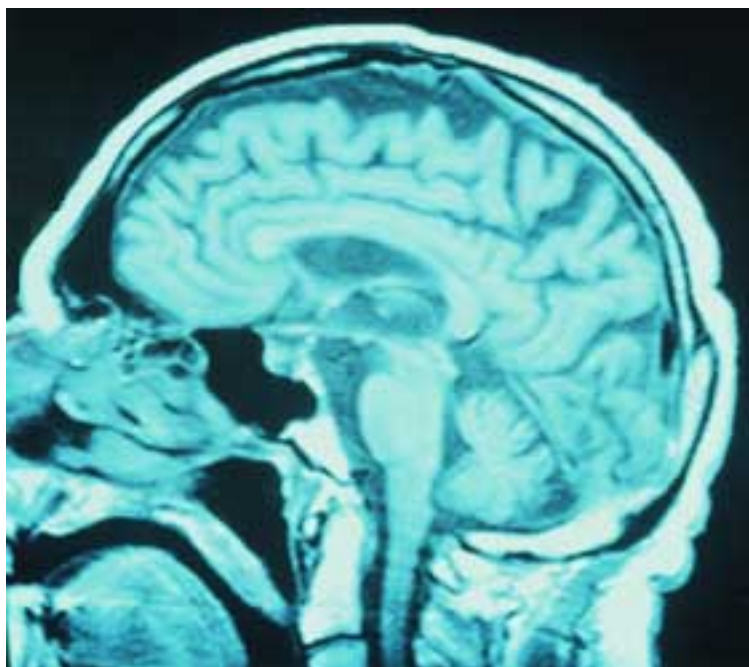


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Is a bird in the hand worth two in the bush? The tendency to choose instant gratification rather than wait for a larger reward is linked to drug addiction, attention deficit/hyperactivity disorder (ADHD), and anti-social behaviour.

Now researchers at the University of Cambridge's [Department of Experimental Psychology](#) have discovered some of the underlying brain systems probably responsible for such impulsive behaviour.

The part of the brain implicated is a structure called the nucleus accumbens which is at the base of the forebrain. The nucleus accumbens responds to natural rewards such as food and sex, as well as drugs such as amphetamine and cocaine, through their effects on the neurotransmitter chemical dopamine.

The research findings will be published in Science magazine and the paper has already been trailed in the online edition - [Science Express](#). The research shows that damage to the nucleus accumbens in rats results in a tendency to take small, immediate rewards, in preference to larger, but delayed rewards. Lesions to two other regions of the brain that send information to the nucleus accumbens core did not cause the rats to behave impulsively.

"We already knew that there was a correlation between abnormalities in the nucleus accumbens and impulsive behaviour," explains researcher Rudolf Cardinal. "Now we have clear evidence that such abnormalities can cause this behaviour."

The findings shed new light on the controversial drug Ritalin (or methylphenidate), generally used in the treatment of ADHD. "Ritalin affects dopamine systems in many areas of the brain. Our research suggests that its actions in the nucleus accumbens may be responsible for its beneficial effects on impulsive behaviour," says Rudolf.

The University of Cambridge's Department of Experimental Psychology is one of the leading British centres for research in the behavioural and cognitive sciences. The Department secured a grade of 5\* in the last UK Research Assessment Exercise. Its work spans human experimental psychology, sensory and perceptual psychology, animal learning, physiological psychology, psychopharmacology

and psycholinguistics.

The research group led by Professors Barry Everitt and Trevor Robbins investigates the neural basis of learning memory, attention, cognition, reward and reinforcement. Research into normal brain function is applied to the understanding of cognitive and behavioural disorders including drug addiction and impulsivity.

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