

# Neuroscientists discover a sense of adventure

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Wellcome Trust scientists have identified a key region of the brain which encourages us to be adventurous. The region, located in a primitive area of the brain, is activated when we choose unfamiliar options, suggesting an evolutionary advantage for sampling the unknown. It may also explain why re-branding of familiar products encourages to pick them off the supermarket shelves.

In an experiment carried out at the Wellcome Trust Centre for Neuroimaging at UCL (University College London), volunteers were shown a selection of images, which they had already been familiarised with. Each card had a unique probability of reward attached to it and over the course of the experiment, the volunteers would be able to work out which selection would provide the highest rewards. However, when unfamiliar images were introduced, the researchers found that volunteers were more likely to take a chance and select one of these options than continue with their familiar – and arguably safer – option.

Using fMRI scanners, which measure blood flow in the brain to highlight which areas are most active, Dr Bianca Wittmann and colleagues showed that when the subjects selected an unfamiliar option, an area of the brain known as the ventral striatum lit up, indicating that it was more active. The ventral striatum is in one of the evolutionarily primitive regions of the brain, suggesting that the process can be advantageous and will be shared by many animals.

"Seeking new and unfamiliar experiences is a fundamental behavioural tendency in humans and animals," says Dr Wittmann. "It makes sense to

try new options as they may prove advantageous in the long run. For example, a monkey who chooses to deviate from its diet of bananas, even if this involves moving to an unfamiliar part of the forest and eating a new type of food, may find its diet enriched and more nutritious."

When we make a particular choice or carry out a particular action which turns out to be beneficial, it is rewarded by a release of neurotransmitters such as dopamine. These rewards help us learn which behaviours are preferable and advantageous and worth repeating. The ventral striatum is one of the key areas involved in processing rewards in the brain. Although the researchers cannot say definitively from the fMRI scans how novelty seeking is being rewarded, Dr Wittmann believes it is likely to be through dopamine release.

However, whilst rewarding the brain for making novel choices may prove advantageous in encouraging us to make potentially beneficial choices, it may also make us more susceptible to exploitation.

"I might have my own favourite choice of chocolate bar, but if I see a different bar repackaged, advertising its 'new, improved flavour', my search for novel experiences may encourage me to move away from my usual choice," says Dr Wittmann. "This introduces the danger of being sold 'old wine in a new skin' and is something that marketing departments take advantage of."

Rewarding the brain for novel choices could have a more serious side effect, argues Professor Nathaniel Daw, now at New York University, who also worked on the study.

"The novelty bonus may be useful in helping us make complex, uncertain decisions, but it clearly has a downside," says Professor Daw. "In humans, increased novelty-seeking may play a role in gambling and

drug addiction, both of which are mediated by malfunctions in dopamine release."

Source: Wellcome Trust

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