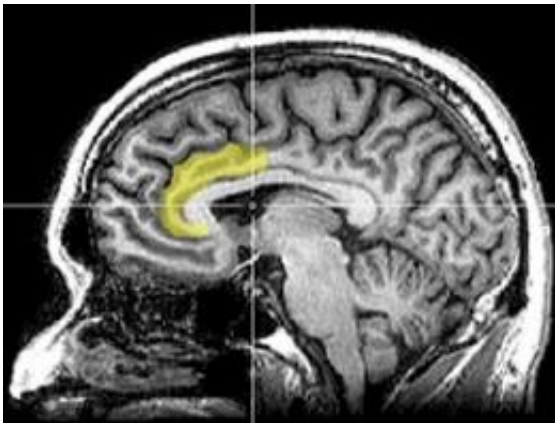


Researchers provide exciting first glimpse into the competitive brain

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(Medical Xpress) -- While most of us have been wrapped up in the competitive spirit of the Olympic Games, two University of Otago researchers have been busy teasing out what exactly in the brain drives competitive behaviour.

Dr Kristin Hillman and Professor David Bilkey, both from the Department of Psychology, have found that [neurons](#) in a specific region of the frontal cortex, called the [anterior cingulate cortex](#), become active during decisions involving competitive effort.

The researchers have discovered that neurons in this region appear to store information on whether a course of action demands competition,

what the [intensity](#) of that competition will be, and critically, whether or not the competition is ‘worth it’ to achieve an end reward.

Their study, which appears online today in the journal *Nature Neuroscience*, is the first to examine how competitive behaviour is encoded by neurons in the [brain](#).

The researchers used a novel experimental set-up for rats which mimics cost-benefit decisions that we humans face every day: do I choose option A which has a small but easily achievable reward, or do I choose option B which, although it provides the prospect of a larger reward, requires me to compete against a peer?

They found that in foraging rats, certain cortical neurons became more active when competitive scenarios like option B were considered and pursued.

Dr Hillman says the activity of these neurons appeared to encode when it was worth competing and when it was too risky.

For example, when up against a highly motivated or physically dominant competitor, a rat’s neural activity patterns changed markedly, she says.

“The resulting signal could be important for both driving competitive behaviour and also steering us away from risky situations where, although the reward might be large, the potential cost is too high.”

The study highlights a critical role for the [frontal cortex](#) in making choices that require investing competitive effort, and represents a pioneering move into understanding the brain mechanisms that produce competitive, ambitious behaviour.

“In theory, it also gives us a glimpse into what might be going on in our

own brains, whether we are highly competitive Olympic athletes or just vying for the last treadmill at the gym,” says Dr Hillman.

More information: Hillman KL and Bilkey DK (2012) Neural encoding of competitive effort in the anterior cingulate cortex. *Nature Neuroscience*, [DOI 10.1038/nn.3187](https://doi.org/10.1038/nn.3187) [epub ahead of print]

Provided by University of Otago

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