

Brain structure may be root of apathy

November 13 2015



When brain scientists at Oxford University studied apathy, they didn't expect to see less motivated people making more effort. Their results suggest that for some people traditionally perceived as lazy, it's biology - not attitude - that might be the cause.

A team of neuroscientists at Oxford, funded by The Wellcome Trust, decided to study young people to see if there were any differences in the brains of those who were motivated compared to those who were apathetic.

Masud Husain, Professor of Neurology and Cognitive Neuroscience, explained: 'We know that in some cases people can become pathologically apathetic, for example after a stroke or with Alzheimer's

disease. Many such patients can be physically capable. Yet they can become so demotivated they won't be bothered to care for themselves, even though they're not depressed. By studying healthy people, we wanted to find out whether any differences in their brains might shed light on apathy.'

Forty healthy volunteers completed a questionnaire that scored them on how motivated they were. They were then asked to play a game in which they were made offers, each with a different level of reward and physical effort required to win the reward. Unsurprisingly, offers with high rewards requiring low effort were usually accepted, while low rewards requiring high effort were less popular.

When volunteers played the game in an MRI machine, so that researchers could study their brains, a surprising finding emerged. Although apathetic people were less likely to accept effortful offers, one area of their brains actually showed more activity than in motivated individuals. The pre-motor cortex is a key area involved in taking actions. It becomes active just before those areas of the [brain](#) that control our movement. Paradoxically, in more apathetic people it was more active when they chose to take an offer than it was in motivated people.

Masud Husain explained: 'We expected to see less activity because they were less likely to accept effortful choices but we found the opposite. We thought that this might be because their brain structure is less efficient, so it's more of an effort for apathetic people to turn decisions into actions.

'Using our brain scanning techniques we found that connections in the front part of the brains of apathetic people are less effective. The brain uses around a fifth of the energy you're burning each day. If it takes more energy to plan an action, it becomes more costly for apathetic

people to make actions. Their brains have to make more effort.'

'As far as we know, this is the first time that anyone has found a [biological basis](#) for apathy in [healthy people](#). It doesn't account for apathy in everyone but by giving us more information about the brain processes underlying normal motivation, it helps us understand better how we might find a treatment for those pathological conditions of extreme apathy.'

Dr Raliza Stoyanova, Senior Portfolio Developer in the Neuroscience and Mental Health team at the Wellcome Trust, said: 'Lack of motivation to act towards achieving even simple goals, for example taking medication, is a feature of some brain disorders but also varies naturally within the population. It's well known that some people are more motivated to achieve the same goals than others, but interestingly, very little is known about the biological basis of such [apathy](#). This study provides important new insights, showing us that the brain systems involved in motivation and preparing for action are important components.'

More information: V. Bonnelle et al. Individual Differences in Premotor Brain Systems Underlie Behavioral Apathy, *Cerebral Cortex* (2015). [DOI: 10.1093/cercor/bhv247](https://doi.org/10.1093/cercor/bhv247)

Provided by Oxford University

Citation: Brain structure may be root of apathy (2015, November 13) retrieved 25 April 2024 from <https://medicalxpress.com/news/2015-11-brain-root-apathy.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is

provided for information purposes only.