

'Build-up of brain toxins is why hard thinking is exhausting'

Western Daily Press · 12 Aug 2022 · 6 · NINA MASSEY wdp@reachplc.com

ALONG, hard day of thinking can sometimes feel as exhausting as a day of physical labour, and now scientists say they know why.



Researchers suggest their findings indicate the reason people feel mentally exhausted, and not drowsy, from intense thinking is not just in their heads.

According to the study, when intense mental work is carried out over several hours, it causes potentially toxic by-products to build up in the part of the brain known as the prefrontal cortex.

This, in turn, alters a person's control over decisions, so they shift toward actions that require no effort or waiting as mental fatigue sets in.

This fatigue tells the brain to shut down in order to save itself.

Mathias Pessiglione, of Pitie-Salpetriere University in France, said: "Influential theories suggested that fatigue is a sort of illusion cooked up by the brain to make us stop whatever we are doing and turn to a more gratifying activity.

"But our findings show that cognitive work results in a true functional alteration – accumulation of noxious substances – so fatigue would indeed be a signal that makes us stop working but for a different purpose: to preserve the integrity of brain functioning."

The researchers monitored brain chemistry over the course of a workday, looking at two groups of people: those who needed to think hard and those who had relatively easier cognitive tasks.

In the group doing hard work they saw signs of fatigue, including reduced pupil dilation. People in that group also made choices toward options proposing rewards at short delay with little effort.

Critically, the researchers say, they also had higher levels of a chemical called glutamate in the brain's prefrontal cortex.

Together with earlier evidence, the authors say it supports the notion that glutamate accumulation makes further activation of this part of the brain costly, such that cognitive control is more difficult after a mentally tough workday.

The findings are published in the Current Biology journal.