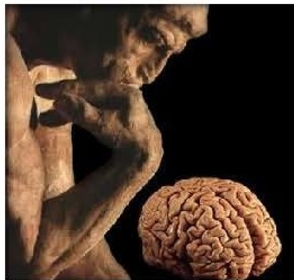




Weekly Safety Tip

Why Does Thinking Hard Make Us Tired?



Why Does Thinking Hard Make Us Tired?

Source: **Mo Costandi** for Big Think August 17, 2022

*Cognitive fatigue results from thinking too hard and long.
Neuroscientists now believe they know why this occurs.*

KEY TAKEAWAYS

- *Thinking hard makes everyone tired, but the neurological mechanism was unknown.*
- *New research suggests that the cause is a build-up of the neurotransmitter glutamate in the lateral prefrontal cortex.*
- *Unfortunately, glutamate cannot be a drug target, since it is the most abundant neurotransmitter in the brain. The best we can do is get plenty of rest.*

Thinking hard for long periods of time is exhausting, but exactly why this “cognitive fatigue” occurs is unknown.

Now, a team of researchers in Paris believes they may have found the answer. In a new study published in the journal *Current Biology*, they report that hard mental work alters brain metabolism by causing the build-up of a neurotransmitter called glutamate in the prefrontal cortex.

The cause of cognitive fatigue

Cognitive fatigue has been explained in various ways over the years, with one popular hypothesis stating that it is a feeling generated by the brain that leads one to perform a cost-benefit analysis, which results in a person stopping the current tiring task and switching to something more rewarding.

As such, cognitive fatigue can be thought of as a kind of “illusion,” but the new findings suggest a biological mechanism instead.

Antonius Wiehler of Pitié-Salpêtrière University in Paris and his colleagues used an imaging technique called magnetic resonance spectroscopy to monitor levels of glutamate and its metabolites in 40 participants while they performed high- or low-demand cognitive tasks throughout the day.

This involved looking at a series of red and green letters shown on a computer screen in quick succession and deciding if each was the same or different from the one before it.

The participants were split into two groups, to perform a hard and easy version of the task, with the level of difficulty depending on the time between the letters and the number of changes in the sequence. All of them performed the same task repeatedly over a period of more than six hours.

The hard version required retaining larger amounts of information in working memory, so those performing it experienced more cognitive fatigue.

Between trials, the researchers measured cognitive fatigue by asking the participants to make simple decisions, such as whether they would like to receive a small amount of money immediately or a larger one later, the *assumption being that cognitive fatigue will reduce their self-control so that they are more impulsive.*

They found that those who performed the hard version of the task were indeed slightly more impulsive.

The scans revealed that this was also associated with an 8% increase in glutamate levels in the lateral prefrontal cortex, which is well-known to play an important role in reward and decision-making. This increase was not seen in participants who performed the easy version of the task.

There's nothing we can do — except rest

The findings suggest that mental exertion and cognitive fatigue lead to an accumulation of glutamate in the lateral prefrontal cortex. This would alter brain metabolism so that more energy is devoted to restoring proper glutamate concentrations and less to non-essential tasks, such as thinking — leading to actions that require less effort and impulsive decisions that lead to short-term rewards.

The study has limitations, however: The sample size of 40 participants is very small, and magnetic resonance spectroscopy is not sensitive enough to distinguish between glutamate and related molecules such as its precursor glutamine.

Even if the findings hold up, they would have few, if any, practical applications beyond, perhaps, helping to detect severe mental fatigue.

Glutamate excitotoxicity is a well-known mechanism of cell death that is implicated in stroke, epilepsy, and other conditions, but glutamate is the most abundant neurotransmitter in the brain, and so it is unfeasible as a drug target.

As for mental fatigue, the best treatment — regardless of cause — is taking regular breaks and sleeping well.

Edited by David A. Varwig, CSP-retired and SCNWO Board Member



Survey Uncovers Key Findings on Falls- from-Height





Survey Uncovers Key Findings on *Falls-from-Height*

ASSP – American Society of Safety Professionals

September 2022

Working-at-height is inherently hazardous, exposing workers to significant risks that range from falls from roofs, scaffolding and ladders to slips through floor and roof openings.

Compounding that is the lack of use of personal protective equipment – and its misuse at times – greatly increases those risks.

A survey conducted last year by CPWR – The Center for Construction Research and Training, supported by ASSP, gathered insights from safety and health professionals that will help advance fall protection in all industries worldwide.

The ANSI/ASSP Z359 Fall Protection and Fall Restraint Committee will use the [key findings](#) from a Fall Experience Survey – which explored the root causes of *falls-from-height* – to enhance consensus standards that guide safety at construction sites and other workplaces.

“While data has been available on the types and rates of fatal and non-fatal falls, we need more information on the causes of those falls,” said Thomas Kramer, P.E., CSP, chair of the Z359 committee. “These new insights expand our knowledge so we can strengthen standards and ultimately prevent injuries and save lives.”

Falls are the leading cause of death among construction workers.

Despite the efforts of safety and health professionals to increase the use of fall protection, 368 construction workers and 805 workers across all industries died from falls in 2020, according to the U.S. Bureau of Labor Statistics.

Fall protection in construction has remained the most frequently cited OSHA violation each year since 2011.

6 key findings surfaced from 671 responses to the Fall Experience Survey:

1. Respondents believe a **lack of planning is a key underlying cause of falls**. Insufficient or ineffective planning was the most selected primary cause for falls (27.4 %).
2. Lack of planning is associated with a **lower likelihood of using fall protection**. Odds of using fall protection were 71 % lower for individuals whose employer failed to plan.
3. Nearly half (48.8%) said **no fall protection was being used at the time of a fall**.
4. Employee beliefs about their company's fall protection policy are strongly associated with their use of fall protection. **Respondents who thought fall protection was required were eight times more likely to use it.**
5. **Rescue training may help reduce fall-related deaths**. The odds of a fall being fatal were 76 % lower for workers who had self-rescue training.
6. **Workers employed by subcontractors face a higher risk of fatal falls**. Subcontractors were 2.7 times more likely to die from a fall compared to those working for a general contractor.

A preliminary report (link provided) has been published by CPWR that provides an overview of the main survey findings, with additional reports of further analyses also planned.

“It’s important to remember that **all falls are preventable**, and that drives us to collect better information that can foster operational solutions,” said Jessica Bunting, MPH, director of CPWR’s Research to Practice (r2p). “Our new data is directly from people who are knowledgeable about workplace environments where falls are common.”

END

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