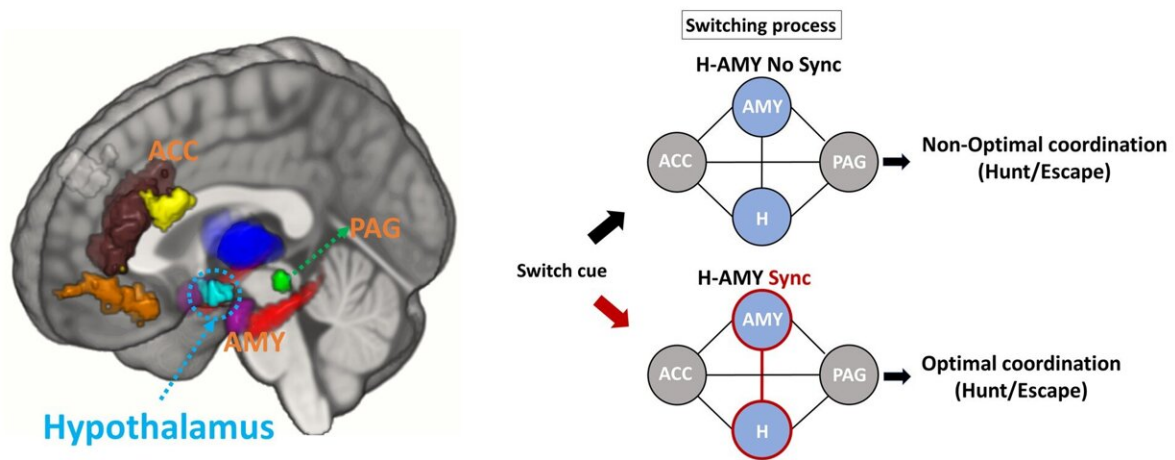


Study finds hypothalamus helps switch between survival tasks

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The left figure illustrates the hypothalamus, a region responsible for encoding the switch between survival-related behaviors, along with its connected regions during the switching process. The right figure demonstrates that the optimal coordination of the switched behavior occurs only when there is pattern synchronization between the hypothalamus and the amygdala. Credit: Jaejoong Kim, California Institute of Technology (CC-BY 4.0, creativecommons.org/licenses/by/4.0/)

The hypothalamus is a small region of the human brain typically associated with regulating body temperature, hunger, thirst, fatigue, and sleep. But it also has another important role: helping the brain and body switch between different and opposing survival behaviors such as

hunting prey and escaping predators.

That's the conclusion of a study published June 27th in the open-access journal *PLOS Biology* by Jaejoong Kim and Dean Mobbs of California Institute of Technology, US, and colleagues.

Previous studies in animals have suggested that the hypothalamus is critical in switching between behaviors, but it has been unclear if this is the case in humans. Studying the brain region in humans is challenging because of the tiny size of the hypothalamus; several of its subregions are below the resolution of typical functional magnetic resonance imaging (fMRI) scans.

In the new study, the researchers developed artificial-intelligence-based approaches to optimize and analyze fMRI scans of the brains of 21 healthy individuals, taken over four-hour periods while people were engaged in a [hunting](#) and escaping survival game within the fMRI scanner. Participants had to control an avatar, switching between hunting prey and escaping a predator.

The researchers built a [computational model](#) to explain the differences in [movement patterns](#) that characterized hunting behavior compared to escaping behavior. Then, they analyzed how changes in movements were linked with subtle changes in hypothalamus activity.

Using this approach, the team discovered that patterns of neural activity in the hypothalamus, as well as nearby regions of the brain that are directly connected to the hypothalamus, are associated with [behavior](#) switching—at least for survival behaviors.

Moreover, the strength of this hypothalamus signaling could predict how well someone would perform in their next survival task. While the association was seen for switching between hunting and escaping

behaviors, it was not observed for switching between other behaviors.

The authors conclude that the hypothalamus plays a key role in how the human brain switches between and coordinates survival behaviors—a function that is important and evolutionarily advantageous.

The authors add, "New research demonstrates the vital role of the human hypothalamus in switching between survival behaviors such as hunting and escaping, employing advanced imaging and computational modeling methods. This research also reveals how the [hypothalamus](#) interacts with other [brain regions](#) to coordinate these survival strategies."

More information: Kim J, Tashjian SM, Mobbs D (2024) The human hypothalamus coordinates switching between different survival actions, *PLoS Biology* (2024). [DOI: 10.1371/journal.pbio.3002624](https://doi.org/10.1371/journal.pbio.3002624)

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