

# Study looks at brain flow, and how people achieve it

November 23 2021, by Karen Michele Nikos-Rose

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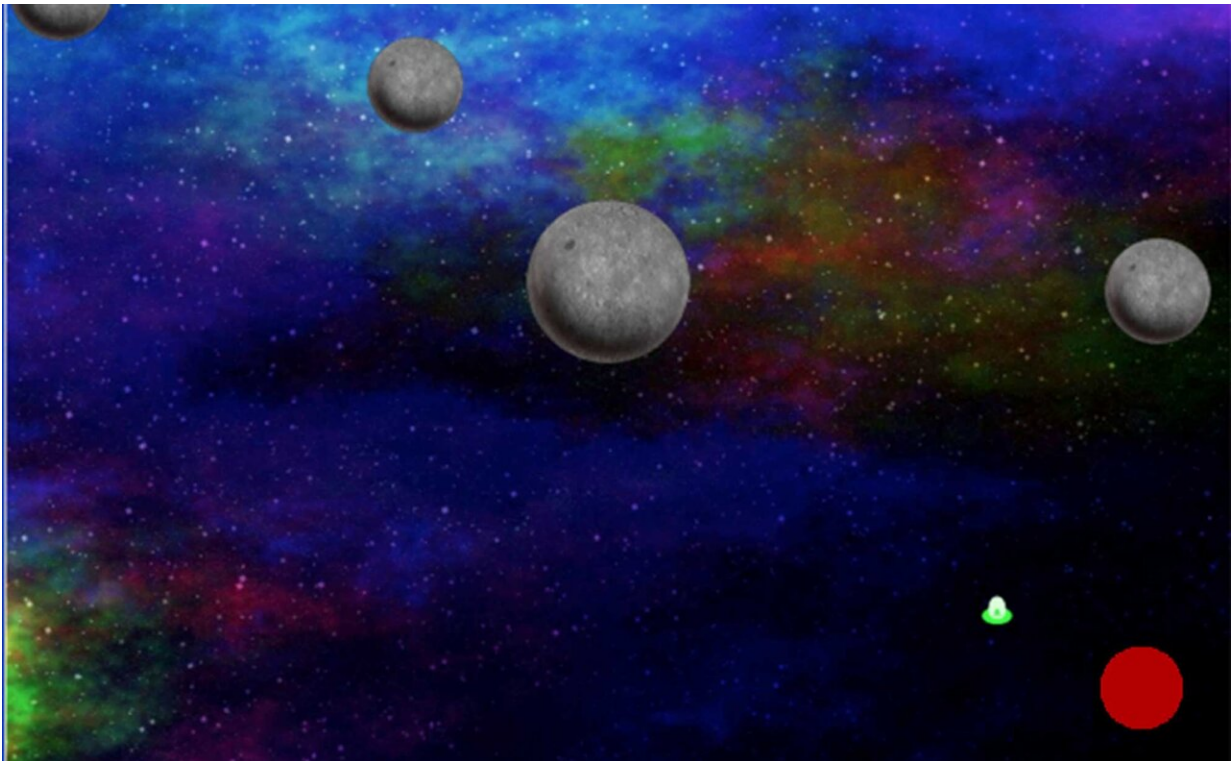


Illustration shows the screen as seen by a game player. The red dot illustrates a distraction the player sees intermittently and must click on in order to continue the game and maintain flow. Credit: Richard Huskey/UC Davis

You are playing such an intense video game and are focused so intently on getting to the next level that you don't know what is going on around you. You have no sense of time passing. You feel great. You are "in the

zone." You are experiencing flow.

You are running a marathon, and you are so focused on the finish line that you barely experience any pain or tiredness until you are done. You are experiencing flow.

"Flow is a state of peak enjoyment that occurs when you are doing something that is difficult and you are highly skilled at," explained Richard Huskey, a University of California, Davis, assistant professor of communication and [cognitive science](#) and author of a new paper on flow.

Flow is said to be good for our well-being—and there is evidence that it can ward off depression, prevent burnout and make us more resilient. We seek it out, but we don't understand how the [brain](#) enables flow very well, Huskey said.

## Looking at flow in media use

In an effort to see what the brain does during flow, Huskey led research looking at how people experience flow while playing a video game. In a paper, which was published in the *Journal of Communication* this month, more than 140 participants played a video game. Some took part in an experiment while playing a game and self-reported their experiences. Others also subjected themselves to brain imaging so that researchers could look at how their brain functioned during flow.

Flow happens, Huskey said, when activities are engaging enough to fully involve someone to the point of barely being distracted, but not so difficult that the activity becomes frustrating.

Similarly, a [video game](#) designed for a child will probably not keep an adult in flow. There must be a balance, he explained. When there's a balance, the person experiences an intrinsic reward. Things like getting

to the next level or earning points matter, but they become secondary. Simply playing the game and experiencing flow is rewarding in and of itself.

Flow requires a high level of attention. To measure this, researchers distracted the players at various points in the game with a probe—a red circle accompanied by a tone—which appeared on the screen in one of the game's four corners. Participants were asked to respond to the probe as quickly as possible.

Previous research has shown that when people focus their attention on one task, they become slower to respond to these probes. Therefore, if flow requires a high level of focused attention, then people should be slowest to respond when the game's difficulty and the player's ability are in balance. This is exactly what the researchers found, and it may explain why people are able to focus on tasks during flow while ignoring distractions.

## **How the brain processes flow**

Very few regions in the brain are responsible for just one cognitive process. So, there is no "flow" region in the brain. Instead, flow results from networked interactions between multiple [brain regions](#). When several brain regions are densely connected with each other but sparsely connected with other regions, this is called a "modular" network configuration.

Importantly, modular network organization is energetically efficient. Research shows that during complex tasks, this modular configuration often reconfigures by connecting different brain regions into a new modular organization. This reconfiguration is called "flexibility," and it is thought to help people adaptively respond to [difficult tasks](#).

"In our study, we showed that flow is associated with a flexible and modular brain-network topology, which may offer an explanation for why flow is simultaneously perceived as high-control and effortless, even when the task difficulty is high," Huskey said.

In other words, the brain in flow is pretty darn efficient.

"Imagine looking for your keys in the morning," Huskey added. "If you don't know where your keys are, you'll need to visit every room in your home and turn on every light. This will require a lot of energy. But if you remember where your keys are, even if you leave them in a different room each day, you can efficiently travel to the right room and turn on only the necessary lights. In many ways, this is similar to the brain during flow—only the necessary brain structures are networked together in an energy efficient way."

In the experiments, researchers showed that a balance between game difficulty and individual ability results in high self-reported flow, high levels of motivated attention, and a flexible and modular brain network topology.

## **People's flow observed**

Of the 140 people studied at two universities, 35 were observed in a functional MRI where they held the game controls, a button box and track ball close to their body while the MRI machine functioned. The others were at a desk, operating the computerized [game](#) with a standard desktop computer.

In flow, people recognize the task's demands and proceed without requiring excess amounts of energy, Huskey said. Flow could, then, relieve the stress of competing demands in our lives, such as pandemic stresses, an overwhelming task at work, a family problem, or all of the

above.

More research is needed outside the lab setting. But this work is a good start toward looking at how the body can be resilient, Huskey said. Researchers should examine linking measures of well-being with neural responses.

That could inform researchers on developing certain treatments, or even media interventions, to improve people's [flow](#) for their own well-being, Huskey said.

**More information:** Richard Huskey et al, Flexible and Modular Brain Network Dynamics Characterize Flow Experiences During Media Use: A Functional Magnetic Resonance Imaging Study, *Journal of Communication* (2021). [DOI: 10.1093/joc/jqab044](https://doi.org/10.1093/joc/jqab044)

Provided by UC Davis

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