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# The importance of pauses whilst learning

***We often see pauses as non-productive moments. New studies show that pauses are critical to the learning process.***

From the time we are young, we are taught that **practice** is essential to becoming good at something. To learn to become ambidextrous at soccer, one must get used to dribbling and shooting with the left foot and repeat the process over and over until it becomes natural. Similarly, to solve a mathematical problem, one must practice until the operations needed to solve it are familiar.

According to a popular school of thought, it is the active and repeated manipulation of instructional material or a hands-on activity that lays the neural foundation for skill development. However, time away from the soccer field or math books is often seen as a break in the learning process. A way to refresh, regenerate and then get back to work, the time when the real practice takes place.

Leonardo Cohen, a neuroscientist at the U.S. National Institutes of Health, believes the idea that **breaks are a time to rest is wrong**, and he laid out his thesis and research in a **study** published in the journal Cell in 2021.

## The study

Cohen and his colleagues used a highly sensitive brain scanning technique called magnetoencephalography to observe the neural activity of young adults as they learned to type words with their nondominant hand. After a practice session, the study participants took a short break and continued to practice, for a total of 35 sessions.

Analyzing the data, Cohen's team made an interesting discovery: during the breaks they observed a **spike in brain activity** that mimicked the neural pattern seen during the practice session, but compressed by twenty times. This means that instead of being idle during a break, the brain was replaying the practice session over and over again at a surprisingly high rate, passing material from the neocortex, where sensory and motor skills are processed, to the hippocampus, the brain's memory center, more than two dozen times within 10 seconds. It turns out, then, that taking a break does not at all mean "disconnecting the brain" from the activity at hand.

The findings echo a rather revolutionary **discovery** in the field of neuroscience made by a team of researchers at the Massachusetts Institute of Technology (MIT) in the United States. In 2001, the team found that rats, after successfully navigating a maze, repeatedly reproduced those memories during sleep.

## The importance of discovery

Cohen explains that when we learn a new skill, our brains must **link it to previous memories**, a process called "neural binding." The classic example to explain this process is that of the piano: when we learn to play the piano, our brain has to link a simple action -- pressing a piano key -- with a larger, more complex skill, such as playing a song. Until now, scientists had been unable to understand how the brain connected these two different actions into an established skill.

Through their research, Cohen's team found that after learning new information, our brains continue to work**, using pauses as a fertile ground for processing, organizing and integrating the learned information**. The thesis of their research is explained by what they call 'neural replay,' which in scientific terms is defined as the "temporally compressed reactivation of neural activity patterns representing behavioral sequences during rest." In other words, after practicing a skill, our brains rapidly replay the experience, compressing the material to optimize storage and recall.

Cohen and his colleagues' main point after this research is that we greatly underestimate the value of pauses in learning. The traditional approach to training prioritizes a method that sees **active practice** as the **only way** to make progress and sees pauses as dead moments. But this is a mistake because, as it turns out, **incorporating breaks into learning plays just as important a role as practice** if a new skill is to be learned. The pause seems to be the period when our brains compress and consolidate memories of what we have just practiced.

## The situation in schools

For corporate training, this problem can be solved easily since it is enough to change internal company rules that incorporate more frequent breaks during training. However, the same cannot be said for training that takes place in educational institutions, from elementary schools to universities. Here, a simple change such as changing class schedules must go through a long bureaucratic chain, where different opinions are often encountered.

Nevertheless, there are several experts who propagate this view. Neurologist and teacher Judy Willis argues that classroom breaks should occur before fatigue, boredom, distraction and inattention take over, meaning they should be much more frequent than they are now.

Dr. Willis, basing her conclusions on decades of research, says that as a general rule, a concentrated study of 10-15 minutes for elementary school and 20-30 minutes for middle and high school students requires a 3-5 minute break. There is no need to increase the teacher's workload by planning fun and different activities each time. Willis says the simplest techniques work well, such as moving to another part of the room, taking a break to stretch, singing a song about the lesson theme to review newly learned content, or chatting informally for a few minutes.

As the school day progresses, there is evidence that brain breaks become increasingly important. A **2016 study** found that our brains begin to feel fatigue toward the end of the day, leading to a significant drop in test performance. This research found that for every hour that passes during the day, test performance decreases significantly.

The inclusion of breaks, however, not only **eliminated the decrease in concentration** throughout the day, but actually **increased performances**. The same researchers concluded that it appears that breaks recharge students' cognitive energy, thus leading to better test scores.

## How to use breaks?

The importance of breaks in education is becoming so important that universities themselves have dedicated pages on their sites to inform and advise students about the importance of breaks and how to put them into practice. On the sites of Italian universities it is more difficult to find them, but let's look at the example of the University of North Carolina in the United States to get an idea. The page on their **site** is very detailed and titled "taking breaks," which means "taking breaks." The site answers questions such as:

- Why are breaks important?
- Which breaks are least effective?
- What types of breaks have positive effects?
- How long should a break last?
- How can you determine which breaks are best for you?
- How can technology help?

The university's website also explains in detail the types of breaks suggested and what purpose they serve. This university, like many others, suggests the **tomato technique** for students to get used to taking breaks throughout the day. This method involves setting a timer to define a work time, followed by a break time. This technique is quite popular and suggests that the best breakdown for taking breaks is a break that can vary between 2 and 5 minutes for every 25 minutes of work.

But let's see what types of breaks are good to take to optimize learning. The University of North Carolina suggests four types of breaks:

**Creativity:**

Getting creative which can consist of activities such as:

- Daydreaming
- Setting a new goal
- Learning something new

Creative activities have a number of potential benefits. They can help exercise the certain areas of the brain, rest the prefrontal cortex, improve memory, and, most importantly, help the brain produce dopamine, which improves our mood and thus our study aptitude.

**Movement:**

Moving around which can consist of activities such as:

- Connecting with nature or the streetscape.
- Going to a different location
- Doing a little workout
- Completing a small task

Any kind of movement is a great way to take a break; It increases executive functions and improves alertness, attention and motivation. Even a simple change of place, inside or outside, can produce calming effects or help fight boredom. Moving and completing a small task can also give a sense of accomplishment that can help increase productivity and motivation.

**Nourishing the body or mind:**

Nourishing the body or mind that can consist of activities such as:

- Taking a power nap
- Drinking coffee or tea
- Having a healthy snack
- Listening to music
- Meditating

Taking a break from work to take care of your body and mind can help you reduce stress and feel more rested, productive and alert when you return to work.

**Socialize:**

Socializing can consist of activities such as:

- Calling a friend
- Calling family
- Talking to a roommate

When you engage with others, you experience a feeling of social connection, which can create a positive emotional state.