

Want to learn a new skill? Faster? Change up your practice sessions

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Credit: Cristie Guevara/public domain

When practicing and learning a new skill, making slight changes during repeat practice sessions may help people master the skill faster than

practicing the task in precisely the same way, Johns Hopkins researchers report.

In a study of 86 healthy volunteers asked to learn a computer-based motor skill, those who quickly adjusted to a modified practice session the second time around performed better than when repeating their original [task](#), the researchers found. The results support the idea that a process called reconsolidation, in which existing memories are recalled and modified with new knowledge, plays a key role in the strengthening of [motor skills](#), says senior study author Pablo A. Celnik, M.D., professor of physical medicine and rehabilitation at the Johns Hopkins University School of Medicine.

"What we found is if you practice a slightly modified version of a task you want to master, you actually learn more and faster than if you just keep practicing the exact same thing multiple times in a row," says Celnik. The work, described in the Jan. 28 edition of the journal *Current Biology*, has implications not only for leisure skills, like learning to play a musical instrument or a sport, but also for helping patients with stroke and other neurological conditions regain lost motor function, he says.

"Our results are important because little was known before about how reconsolidation works in relation to motor skill development. This shows how simple manipulations during training can lead to more rapid and larger motor skill gains because of reconsolidation," says Celnik. "The goal is to develop novel behavioral interventions and training schedules that give people more improvement for the same amount of practice time."

For the study, volunteers came to Celnik's laboratory to learn and perform an isometric pinch task over the course of two or three 45-minute sessions. This entailed squeezing a device called a force transducer to move a computer cursor across a monitor. The screen test

featured five windows and a "home space." Participants were asked to move the cursor from home to the various windows in a set pattern as quickly and accurately as possible.

The volunteers were randomly assigned to one of three groups. The first group completed a typical training schedule where after the initial training session, they repeated the exact same training lesson six hours later—based on previous studies, the amount of time believed needed to consolidate memories from the first session—and again the next day. The second group performed the first practice session and, after six hours, completed a second training session in which Celnik and colleagues had tweaked the test so that the force needed to be changed ever so slightly in every trial. In this manner, individuals had to constantly adjust their performance despite not being aware of the subtle modifications. The next day, these participants returned to the lab and were asked to repeat the same task they were given during the first session. The third "control" group performed the exact same task just once each day, skipping the second training session altogether.

Celnik says the gains in performance, such as a speedier and more accurate completion of the task, nearly doubled among those in the second group, who were given the altered second session, compared to those in the first group, who repeated the same task, Celnik says.

Highest gains were seen among those subjects who were able to quickly adapt to the change in conditions. Participants in the third group, who skipped the second session, performed approximately 25 percent worse than those in the first group.

Celnik says the alterations in training have to be small, something akin to slightly adjusting the size or weight of a baseball bat, tennis racket or soccer ball in between practice sessions. Current studies by Celnik's team, still underway and not yet published, suggest that changing a

practice session too much, like playing badminton in between tennis bouts, brings no significant benefit to motor learning.

"If you make the altered task too different, people do not get the gain we observed during reconsolidation," he says. "The modification between sessions needs to be subtle."

Provided by Johns Hopkins University School of Medicine

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