



Why Cramming Doesn't Work

By DAVID GLENN

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Most college instructors probably aren't about to start giving the daily quizzes that some researchers recommend to improve learning, so students might want to try testing themselves when they study on their own. But there's a catch: When people study with flashcards, by far the most common method of self-quizzing, they're notoriously bad at judging when they have mastered the material.

"People tend to drop an item out of their flashcard stack after they've gotten it correct just once," says Jeffrey D. Karpicke, who will become an assistant professor of psychology at Purdue University this fall. Immediately after you look at a flashcard, the item "feels" very accessible because it's sitting in your short-term memory, Mr. Karpicke explains, but that's not necessarily an accurate gauge of whether you will remember it a week from now.

Another pitfall: Mr. Karpicke's studies suggest that if you want to implant facts in long-term memory, it's best to receive feedback on a quiz after a short delay of 5 to 20 minutes. But flashcards (at least as they are ordinarily used) give feedback immediately.

In an experiment presented last month at the annual meeting of the Association for Psychological Science, Nate Kornell, a

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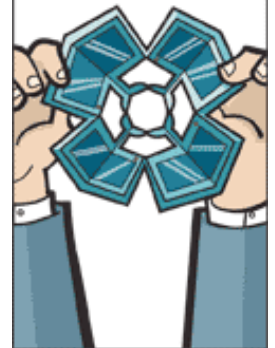
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postdoctoral fellow in psychology at the University of California at Los Angeles, and Robert A. Bjork, a professor of psychology there, asked people to study 20 word pairs on flashcards during a one-hour period.

Half the participants reviewed the full cycle of 20 cards eight times. The other half broke up the pile into small stacks, studying five cards at a time, reviewing them eight times, then moving on to the next small stack.

Early in the experiment, the people using the small stacks felt pretty good about their progress. They predicted (on average) that on the final exam, they would remember 68 percent of the words. The people studying the full stack, by contrast, predicted that they would remember only 53 percent.

But on the final exam administered at the end of the hour, their performance was actually the opposite. The people who repeatedly studied the full cycle of cards had an average exam score of 80 percent, while the "small stack" participants scored only 54 percent.

Now, you might say that's just because the "small stack" participants had forgotten the words that they studied in their first batches, early in the hour. But even on the words they studied in their last batch, the small-stack participants scored just 68 percent, so their performance still trailed that of the full-stack group.

This is just the latest piece of evidence, Mr. Kornell says, that cramming doesn't work. When you study an unfamiliar fact again and again in immediate succession, he says, it feels much better embedded in your memory than it actually is. It's much better to create an interval between the times you study an item. (The people cycling through the full stack of cards studied each card every seven minutes or so, which is a decent interval.)

The problem, Mr. Kornell says, is that cycling through a large stack of flashcards, like many other effective study methods, is more frustrating than the less-effective techniques people usually use. "People aren't going to torture themselves," he says. "It's always a balancing act."

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