

Back to School: Cramming Doesn't Work in the Long Run

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When you look back on your school days, doesn't it seem like you studied all the time? However, most of us seem to have retained almost nothing from our early immersion in math, history, and foreign language.

Were we studying the wrong way during all those wee hours? Well, as it turns out we may have been. Psychologists have been assessing how well various study strategies produce long-term learning, and it appears that some strategies really do work much better than others.

Consider "overlearning." That's the term learning specialists use for studying material immediately after you've mastered it. Say you're studying new vocabulary words, flash-card style, and you finally run through the whole list error-free; any study beyond that point is overlearning. Is this just a waste of valuable time, or does this extra effort embed the new memory for the long haul?

University of South Florida psychologist Doug Rohrer decided to explore this question scientifically. Working with Hal Pashler of the University of California, San Diego, he had two groups of students study new vocabulary in different ways. One group ran through the list five times; these students got a perfect score no more than once. The others kept drilling, for a total of ten trials; with this extra effort, the students had at least three perfect run-throughs. Then the psychologists tested all the students, some one week later and others four weeks later.

The results were interesting. For students who took the test a week later, those who had done the extra drilling performed better. But this benefit of overlearning completely disappeared by four weeks. In other words, if students are interested in learning that lasts, that extra effort is really a waste. They should instead spend this time looking at material from last week or last month or even last year.

In other words, as reported in the August issue of *Current Directions in Psychological Science*, "massing" all the study on a single topic into a single session reduces long-term retention. It's better to leave it alone for a while and then return to it. Rohrer and Pashler also wanted to see if the duration of study breaks might make a difference in learning. It did. When two study sessions were separated by breaks ranging from five minutes to six months, with a final test given six months later, students did much better if their break lasted at least a month. So, rather than distribute their study of some material across just a few days, as millions of school children do when given a different list of vocabulary or spelling words each week, students would be better off seeing the same words throughout the school year.

All these experiments involved rote learning, but Rohrer and Pashler have also found similar effects with more abstract learning, like math. This is particularly troubling, the psychologists say, because most mathematics textbooks today are organized to encourage both overlearning and massing. So students end up working 20 problems on the same concept (which they learned earlier that day) when they should be working 20 problems drawn from different lessons learned since the beginning of the

school year. In brief, students are wasting a lot of precious learning time.