It's exam time for high school students. The pressure is on, and where there's pressure, there is choking under that pressure. But what is going on when someone chokes? Some recent research suggests that, ironically, high achievers are more likely to choke than others.

There is a distinction here between choking in sports and choking on a math exam. A variety of studies have shown that one of the main reasons athletes choke is that they are paying too much attention to what they're doing. For instance, if soccer players dribbling the ball through a slalom course of pylons are asked to pay attention to the side of the foot that contacts the ball, their performance deteriorates.

The same thing happens to people who are concentrating on the mechanics of their golf swing - it falls apart. These are examples of allowing the conscious mind to intrude on procedures that have become routinized.

It's also possible to be distracted by outside events, like the fans sitting behind the basketball net waving to distract the player shooting foul shots, but it's pretty clear that once players have been trained to ignore such things, the waving doesn't bother them at all.

Writing an exam is different. There is no physical routine to be followed and, ideally, a minimum of outside distractions. So, what causes choking in that situation?

Sian Beilock and Thomas Carr of Miami University in Ohio are convinced that it's all about working memory.

Working memory is a slightly misleading label because the memory in this case is very brief, in most cases lasting only a few seconds. It's the memory you use to hold a phone number in your mind while you cross the
room to get to the phone. It is extremely important in math, even simple math, because it allows you to do calculations in your head.

Try counting backward by sevens from 100 - you're using your working memory.

The space allotted to working memory in your brain is not infinite. If you clutter it up with phone numbers, things you were about to say and the intention to get something from the bathroom, it can overload, with the result that you won't do anything very well. For most of us, true multi-tasking has its limits.

However, some people have more working memory capacity than others, and many of those high-capacity people are pretty good at math. So good, in fact, that over time, they adopt strategies for solving problems that are uniquely suited to their prodigious working memory. And that can be their downfall.

Beilock and Carr tested this idea by having students do a series of straightforward calculations involving, first, a subtraction step, then, a division. The harder the initial subtraction step, the more demands were put on working memory: 5-3 = 2 is easy; 45-27 = 18 isn't.

On the basis of other tests, students were divided into those with good working memory and those without, and a final complication was added by having them perform the test in either a low- or high-pressure situation. The high-pressure version - a complicated one for a psychology experiment - was created by telling participants that they would receive money for doing well, and that an unidentified teammate would also get money depending on how well they did.

When all the possible combinations were analyzed, it turned out that those who tended to choke the most were individuals who came into the test with good working memory but had that memory capacity challenged by both the pressure of the situation and the demands of the calculation. Their performance declined more in the high-pressure situation than students with below-average working memories, whose performance remained more or less the same.

There is more to this story than the simple irony that those who would, under most circumstances, perform simple calculations the best are, in fact, the ones that suffer most when the pressure is on. It shows how even the highest-capacity working memories can be pushed beyond their limits and, most important, that it isn't just numbers and data that can overload it. Anxiety and the desire to do well can push their way into working memory just as effectively.

What can students do to avoid this trap?

It's the same old story: Keep cool and stay focused. Easy to say, hard to do.

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