Test Pressure Toughest on Smartest

By E.J. Mundell, HealthDay Reporter

WEDNESDAY, March 9 (HealthDay News) -- Researchers may have discovered why an IQ of 160 doesn't guarantee a great score on the SAT.

Experiments using an increasingly high-pressured math quiz suggest that testing anxiety reduces the ability of very smart people to tap into what experts call their "working memory capacity."

The result: These highly intelligent test-takers choked under pressure, losing their advantage over normally less-adept participants. On the other hand, stress didn't seem to affect the scores of less intelligent participants.

"It seems to be leveling the playing field," said researcher Sian L. Beilock, an assistant professor of psychology at Miami University in Oxford, Ohio. "What seems to be happening is that pressure is using up the capacity that these higher-working-memory people normally have to achieve their outstanding performance."

Another expert stressed there's a simple way brainy types can regain that natural advantage, however.

By rehearsing the test beforehand in an equally pressured environment, "you can really do a lot through practice and training to improve," said Jeremy Gray, an assistant professor of psychology at Yale University.

Both Gray and Beilock agreed the findings have real implications for the interpretation of tests such as the SAT.

"We need to caution people not to conflate intelligence with performance," Gray said. "It's seductive to say, 'Oh, performance on the SAT means that they are intelligent.' But we need to account for the fact that whenever you take a test there's a situation going on there, too."

In the study, published in the current issue of Psychological Science, Beilock and co-researcher Thomas Carr, of Michigan State University, compared the performance on a math test of 93 Michigan State undergrads. They first tested the students for their individual levels of working memory, and divided them into two groups (low working memory/high working memory), based on those results.

Working memory is "our short-term memory, used to hold information about what we're doing in an immediate and active form," Beilock said. "People who have more working memory have more attention to devote to short-term tasks, under normal conditions. They can hold and manipulate more information than someone who has less."

Many researchers associate intelligence with working memory, she explained.

But does this natural advantage hold true when stress enters into the picture?

To find out, Beilock and Carr had the low/high working memory students solve complex math problems. In one experiment, the students were simply told to work through them at their own pace. But in subsequent experiments, the investigators ratcheted up anxiety levels via time constraints and other manipulations, such as telling the students they were now part of a team or were being videotaped for review by experts later on.
Very intelligent individuals with high working memory tended to crumble under those pressures, Beilock said, bringing their test scores down. On the other hand, test scores for students with relatively low levels of working memory remained more or less the same, regardless of the pressures put on them.

Situational stress appears to draw cognitive attention away from the task at hand, undermining the performance of highly intelligent people who tend to rely more on this attention for successful performance, Beilock explained.

On the other hand, "the reason we don't think it's dragging the low-working-memory people down is that we don't think they're relying as much on short-term memory. So if you don't have the tools to lose, you're not going to be as affected," Beilock said.

Instead, she said, individuals without a large store of working memory may tend to rely on other problem-solving methods, such as informed guessing or other strategies, to help them arrive at an answer -- although such strategies will not always lead to the correct answer.

Gray stressed that truly smart students can -- and do -- perform well, even under great pressure.

"With proper practice and preparation, even if you're flustered -- which virtually everyone is -- you'll fall back on a higher level of what you bring to the situation," he said.

He pointed to the example of U.S. Army Special Forces troops, who train over and over in simulated, high-pressured environments.

"So then it's not the attentional control that you fall back on when the real moment comes, it's your prior knowledge and experience," he said.

The same may hold true for testing. According to Gray, many commercial test-prep courses rely on simulation and practice to help students achieve on the SAT, LSAT, MCAT or other high-stakes exams.

"I'd suggest trying to practice in a way that is somewhat anxiety-provoking, so that you have practice with the anxiety, as well as the actual test material," he said.

"The bottom line," Gray said, "is that there's a lot more to what it means to be a person than raw computational power. If you think about that as being intelligence, that's a limited view."

Beilock agreed, adding that even Einstein might not have shown his true worth if he'd competed on, say, Jeopardy.

"He'd probably still be better than everyone else," she speculated, "but he still might not be as great as if he was playing in his living room alone."

More information

To learn more about intelligence testing, visit the American Psychological Association (www.apa.org).

SOURCES: Sian L. Beilock, Ph.D., assistant professor, psychology, Miami University, Oxford, Ohio; Jeremy Gray, Ph.D., assistant professor, psychology, Yale University, New Haven, Conn.; February 2005 Psychological Science

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Printed for "Sian L. Beilock" <beilocsl@muohio.edu> 3/29/2005