Doubts raised about SAT's reading test

College hopefuls taking the Scholastic Aptitude Test (SAT) might consider answering the multiple-choice questions following reading-comprehension passages without reading the passages themselves; they may do almost as well as if they had actually read the passages, while saving valuable time for completing other parts of the SAT's verbal section.

That, at least, is the conclusion of a study in the March Psychological Science. College students scored well above chance (random guessing) on a sample SAT reading-comprehension task with the reading passages deleted, report psychologist Stuart Katz and his colleagues at the University of Georgia in Athens. Almost two-thirds of the questions following reading passages do not tap into the test-taker's comprehension of the passages, the scientists maintain.

"Here's a task that's been carefully developed using the most arcane, advanced techniques of a leading educational organization, but it doesn't measure what it's supposed to," Katz asserts.

So what does the reading-comprehension task measure? According to Katz, it largely gauges "testing skills," which include the ability to derive correct answers by analyzing the structure and phrasing of questions and by using knowledge from one's background to help weed out improbable answers.

The new report appears in the midst of an extensive review of SAT items by the Educational Testing Service (ETS) in Princeton, N.J., which formulates the college-entrance examination.

"We think the Katz study is important, but it has some technical problems," says ETS psychometrist Cathy Wendler. "I'm sure his research will be taken seriously in our ongoing SAT review."

Katz and his co-workers administered reading-comprehension questions from 1983 versions of the SAT to 197 college students, some of them honors students. None of the students had taken the SAT in 1983. Exam-takers must answer a group of multiple-choice questions based on what is stated or implied in a short passage preceding the questions. The researchers presented students with a total of 100 questions derived from 24 passages. Each question was followed by five possible answers, only one of which was correct.

Test scores for the 75 students who read the passages averaged 57 and rose to 70 among honors students. The rest answered questions without passages and averaged 38 correct responses, with honors students scoring about 46, far exceeding a chance score of 20.

The students' precollege scores on the entire SAT verbal test — which includes three sections in addition to reading comprehension — were strong statistical predictors of their scores on the experimental reading-comprehension task regardless of whether or not passages were included, the researchers found. This suggests that testing skills, rather than an understanding of the passages, contribute more to sorting out better performers from poorer ones, Katz argues.

Students who took the no-passage test answered 61 of the items correctly at least 30 percent of the time, indicating that those items have little to do with reading comprehension, Katz adds.

Reading comprehension is the most time-consuming part of the verbal section, so the implications of the no-passage strategy are important, Katz says. He notes that at least one SAT coaching school instructs its pupils to answer reading-comprehension questions using information unrelated to the passages, although SAT handbooks published by ETS instruct students to read the passages and ignore background knowledge or intuition.

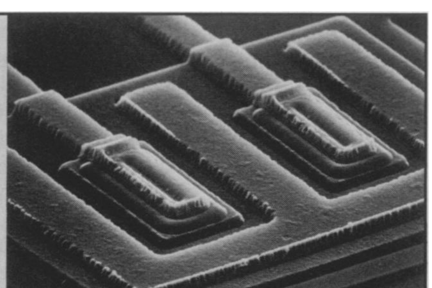
"You can't create reading-comprehension questions in isolation from a person's background knowledge," Wendler responds. But she argues that the test — indeed, the entire SAT verbal section — measures "general verbal reasoning skills" rather than "reading comprehension" or any other specific skill.

Wendler also says the college students tested by the Georgia researchers were brighter and more knowledgeable than the average high school student taking the SAT, and that this may have inflated scores on the no-passage tests.

"There's no one right way to take the SAT," she maintains. Katz replies: "Our evidence should be enough to alert those who take the SAT, or make use of its results, that it may tell a story different from the one now generally accepted."

— B. Bower

Germanium speeds transistor



IBM Corp.

Faster transistors can lead to faster, more powerful computers, which could make snappier bank transactions, more reliable weather predictions and more detailed simulations for research and product design. The silicon-based transistors shown at right can open and then close off a pathway of electrons as many as 75 billion times a second — a rate that nearly doubles the previous record and outpaces silicon transistors in today's mainframes by about sevenfold.

Germanium, a bigger chemical look-alike of silicon, is the key to making these "screaming-fast transistors," says Bernard S. Meyerson, who helped develop the devices at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y. The researchers used a technique called molecular beam epitaxy to control the proportion of germanium atoms in hundreds of successive atomic layers of silicon. The resulting germanium-silicon combination "is the equivalent of having a downhill slide across the base of the transistor, down which electrons can travel [faster]," Meyerson suggests. Other transistor makers have been unable to control the germanium content in silicon transistors with as much precision or without adding too many material defects for practical applications, he says.

The new transistors are raising eyebrows even among those who predict gallium arsenide will replace silicon in future computer chips, says Dirk J. Bartelink, who manages the new materials and structures group at Hewlett Packard Co. in Palo Alto, Calif.

Ceramics go to new lengths

Like unexceptional children who discover exceptional talents later in life, ceramics recently have been revealing abilities that no one suspected they had. In 1986, for example, ceramics became celebrities as high-temperature superconductors. In the March 29 Nature, Fumihiro Wakai of the Government Industrial Research Institute in Nagoya, Japan, and his co-workers describe another unanticipated talent of certain ceramics: superplasticity. Using mostly silicon nitride and silicon carbide, the scientists fabricated ceramic strips, then stretched the still-hot strips to more than 2½ times their starting lengths.

The ceramic composite's ability to stretch during processing brightens hopes for using silicon nitride and silicon carbide — already known for their hardness and strength — where they have never been used before. For example, Wakai and his colleagues suggest engineers might readily mold superplastic ceramics into intricate shapes that require little or none of the expensive post-production machining that has mostly prevented ceramics from replacing metals in large-scale applications such as wear-resistant engine parts.

"Ceramics have always been brittle materials that you could not deform much," observes materials scientist Rishi Raj of Cornell University. "This is something really brand new." □