

## Encouraging competitiveness

### Psyched out

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#### The fewer the competitors, the harder they try

Alamy



#### Calculate the answer when $n$ approaches infinity

WHAT relationship there is between the number of participants in a competition and the motivation of the competitors has long eluded researchers. Does the presence of a lot of rivals stimulate action or lead someone to give up hope? It is more than an academic question. Or, rather, it is a very academic question indeed, for it may affect the way that examinations are conducted if they are to be a fair test for all.

To investigate the matter two behavioural researchers, Stephen Garcia at the University of Michigan and Avishalom Tor at the University of Haifa in Israel, looked at the results of the SAT university entrance examination in America in 2005. This test generates a score supposedly based on the test-taker's verbal and analytical prowess.

The two researchers used data on the number of test-takers in each state of the union and the number of test-taking venues in that state to calculate the average number of test-takers per venue in the state in question. They found that test scores fell as the number of people in the examination hall increased. And they discovered that this pattern was also true for the Cognitive Reflection Test, another analytical exam.

These results are intriguing, but lend themselves to more than one explanation. To find out whether they were caused by a psychological effect related to the

number of perceived competitors, or were merely a consequence of the greater distraction produced by crowding more people together, Dr Garcia and Dr Tor conducted an experiment. They asked 74 university students to take a timed, easy general-knowledge quiz which they were asked to finish as quickly as possible without compromising accuracy. Each student completed the test alone, but half were told they were competing against ten other people and the other half that they were competing against 100. All were informed that those whose completion times were in the top 20% would receive \$5.

The results backed up the psychological hypothesis. Students who believed they were competing against only ten people finished in an average of 28.95 seconds. Those who believed they were competing against 100 averaged 33.15 seconds.

Curious as to why mere belief that he was facing more competitors would alter an individual's performance, the two researchers ran a second experiment. They asked students to imagine they were running a five-kilometre race against 50 people and then against 500 (or, in half of the cases, the other way round). In both notional races the top 10% of competitors would get a \$1,000 prize. The researchers told the students to rate, on a seven-point scale, how much faster than normal they would run in each notional race, with a one being slightly faster than normal and a seven being the fastest of their lives. The average value in the competition against 50 others was 5.43; in the competition against 500 it was 4.89—a result consistent with the other two parts of the study.

When that bit of the test was over, Dr Garcia and Dr Tor then asked the participants a series of questions commonly used by psychologists to evaluate an individual's tendency to compare himself with others in a social environment. They found that those with the highest tendency to make such comparisons had the lowest scores in the notional race against 500 others. These socially aware individuals are, as it were, looking around, assessing the situation and thinking that it is not worth trying too hard.

In their report on the matter in *Psychological Science*, Dr Garcia and Dr Tor dub their discovery the "n-effect" since "n" represents any numerical value in mathematics. If confirmed, it may mean not only that examination halls should be kept small— or, at least, the same size for all participants so that the playing field is level—but also that other competitive activities should be scaled down for best results.