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Testing, Stress, and Performance: How Students Respond Physiologically to High-Stakes Testing

Heissel, Jennifer A.; Adam, Emma K.; Doleac, Jennifer L.; Figlio, David N.; Meer, Jonathan

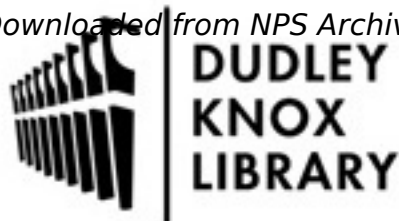
NBER

Heissel, Jennifer A., et al. Testing, Stress, and Performance: How Students Respond Physiologically to High-Stakes Testing. No. w25305. National Bureau of Economic Research, 2018.

<http://hdl.handle.net/10945/61762>

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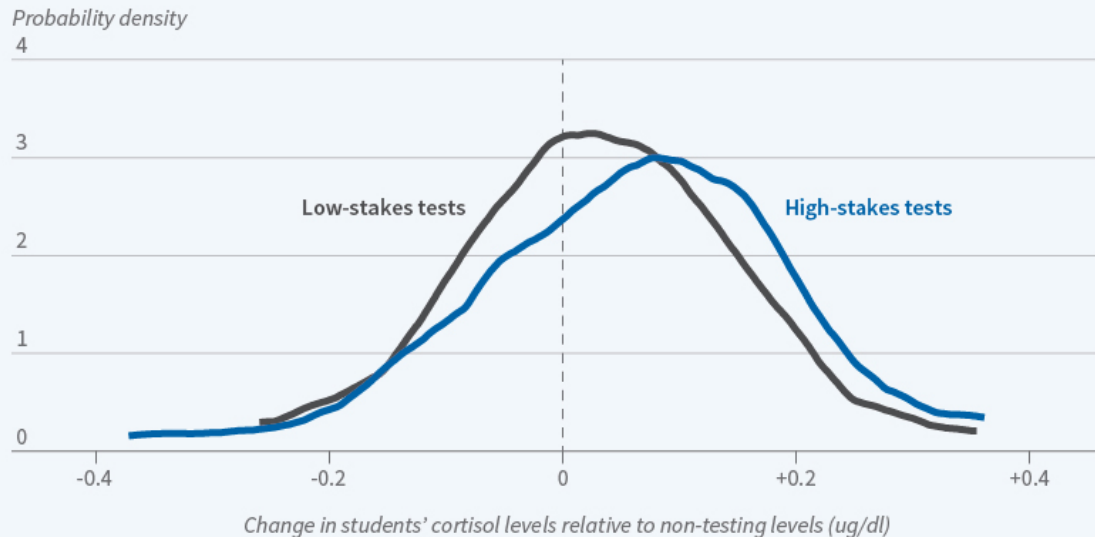
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Test-Related Stress and Student Scores on High-Stakes Exams

Academic Testing and Students' Stress Levels



"Low-stakes tests" are internal school tests, while "high-stakes tests" are statewide standardized tests
 Source: Researchers' calculations using data from a study of students from a charter school network in New Orleans

Standardized tests are widely used to gauge student capabilities and inform educational programming. Test scores can also shape the academic destinies and careers of students. Their importance can generate stress among test-takers.

In Testing, Stress, and Performance: How Students Respond Physiologically to High-Stakes Testing (NBER Working Paper No. 25305), [Jennifer A. Heissel](#), [Emma K. Adam](#), [Jennifer L. Doleac](#), [David N. Figlio](#), and [Jonathan Meer](#) document that students' level of a stress hormone, cortisol, rises by about 15 percent on average in the week when high-stakes standardized tests are given.

The study analyzes administrative data, student diaries, and saliva samples of New Orleans students in grades 3-8 in the 2015-16 academic year. Most students in the study were low-income African Americans, but they hailed from different areas of the city, with different levels of wealth and crime. The students took saliva samples during different periods of the year, which allowed the researchers to compare cortisol levels in weeks with and without high-stakes tests.



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NATIONAL BUREAU OF ECONOMIC RESEARCH

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March 2019

Favoritism toward China's Former State-Owned Enterprises

China's two-decade push to privatize state-owned enterprises (SOEs) has created better-performing companies, but former SOEs still benefit from some forms of state support. These firms receive low-interest loans and subsidies more frequently, and in greater quantity, than other enterprises.

In Case a Tiger Change Its Stripes?
Reform of Chinese State-Owned Enterprises in the Penumbra of the State (NBER Working Paper No. 25475), Ann Harrison, Marshall Meyer, Peichun Wang, Linda Zhao, and Minyuan Zhao find that the benefits for former SOEs became more pronounced after the 2008 global financial crisis, when the Chinese government launched a trillion-dollar stimulus package.

Former SOEs, while more innovative and slightly more profitable than currently state-owned firms, remain less innovative and profitable than Chinese companies that have always been in the private sector. "The tiger can change its stripes," the researchers conclude. "However, the government's behavior seems to be sticky."

Using a dataset of all medium and large Chinese enterprises covering the period from 1998 to 2013, the researchers find that, before the 2008 crisis, the interest rate on loans to private firms was more than one percentage point higher than that on loans to former SOEs. Post-crisis, the difference widened to two percentage points. Currently state-owned firms receive more subsidies and lower interest rates than formerly state-owned firms, which in turn are favored relative to always-private firms.

SOEs enjoyed an even lower interest rate than the former SOEs. Former SOEs also occupied the middle ground with respect to government loans. Private firms received about 73 percent less in loans (as a share of output) than did SOEs, while privatized SOEs received 45 percent less. These disparities have narrowed over time.

The same held true for subsidies. In 1998, fewer than 15 percent of onetime SOEs got subsidies; by 2013, their share was 25 to 35 percent. For current SOEs, the comparable shares were 15 percent and 45 percent. Private enterprises, at 5 percent and 15 percent, were less likely to receive subsidies than either current or past SOEs. The size of the subsidies also varied. The average for private firms, per 1 million



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The increase in cortisol in test weeks is largely the result of a sharp increase — 35 percent on average — for male students. There are no substantial changes for females between testing weeks and other weeks. The researchers also find larger increases in cortisol for students from neighborhoods with higher poverty rates, and larger numbers of 911 calls, although the evidence is not conclusive.

Large spikes in cortisol levels can lead to a lack of focus, recall, and ability to perform tasks. The researchers compare the test scores of students who showed a cortisol increase or decrease of more than 10 percent in the test week relative to the no-test week, and those whose cortisol level was similar across weeks, controlling for expected academic performance. Such a rise or fall in cortisol is associated with a 0.4 standard deviation decrease in the test scores — the equivalent of a drop of approximately 80 points on the 1600-point SAT scale. These findings suggest that for some students, physiological reactions to test-taking may diminish their scores.

— Jay Fitzgerald

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