

Cognitive Endurance as Human Capital

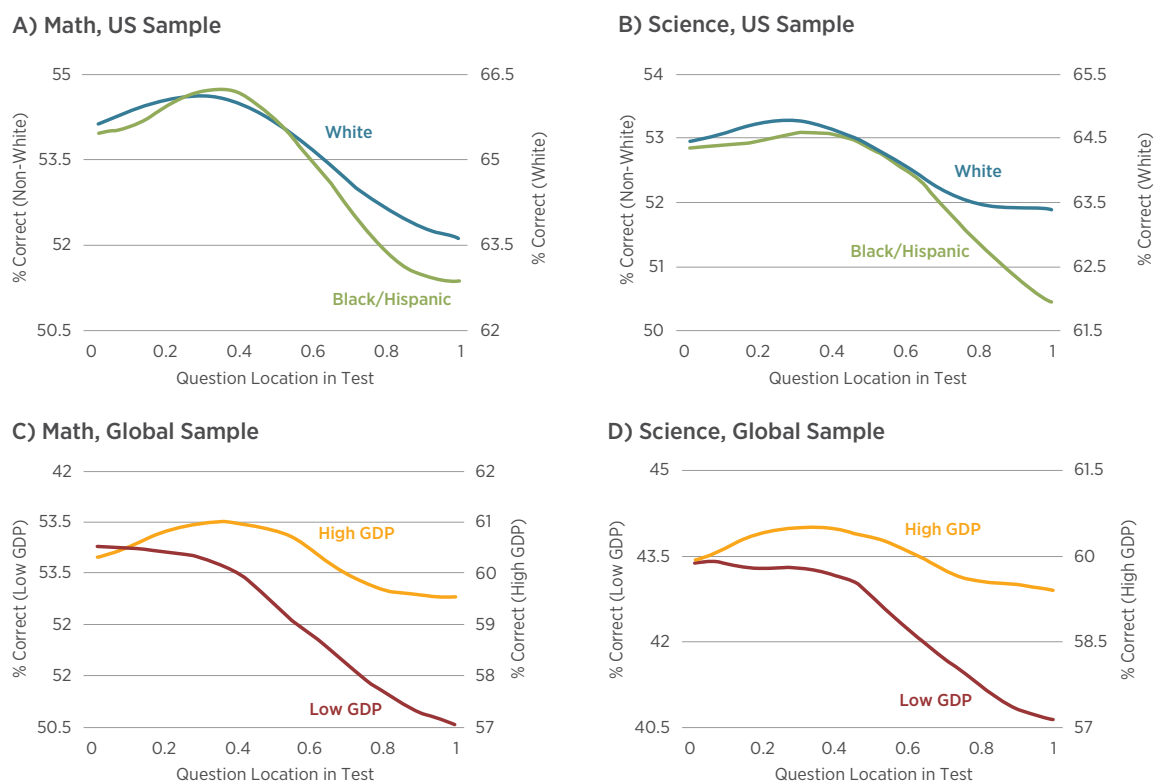
Based on BFI Working Paper 2022-73, [“Cognitive Endurance as Human Capital,”](#) by Christina L. Brown, University of Chicago; Supreet Kaur, University of California, Berkeley; Geeta Kingdon, UCL Institute of Education; and Heather Schofield, University of Pennsylvania

Globally and in the US, the poor exhibit cognitive fatigue more quickly than the rich, and they also attend schools that offer fewer opportunities to practice thinking for continuous stretches.

Among its other benefits, schooling may expand students’ underlying capacity for cognition, including the ability to engage in effortful thinking, which constitutes a more expansive view of how education shapes general human capital. This research examines this phenomenon by focusing on how schooling engages students in effortful thinking for continuous stretches

of time. In other words, do in-class exercises like reading and other forms of sustained concentration expand cognitive endurance, or the ability to sustain performance over time during a cognitively effortful task? Existing literature suggests that the answer is “yes,” but evidence remains limited.

Figure 1 • Performance Declines in Achievement Tests



Notes: These figures plot performance declines over time: the proportion of students in each sample who answer a given question correctly (y-axes) against the question’s location in the test (x-axis). The plots control for question (question block) fixed effects. The authors graph declines in the global sample as well as US sample, separately for each test subject and by proxies for socioeconomic status (using separate y-axes). The figures show student performance over the length of the TIMSS test, a prominent global examination. TIMSS is administered to fourth graders in more than 50 countries. Please see working paper for more details.

To address this question, the authors designed a field experiment in a setting where time in focused cognitive activity is limited: low-income primary schools in India. Their sample comprised 1,636 students across six schools in grades 1-5, who were randomized to either receive continuous stretches of cognitive practice, or to a control class period with no such practice. The authors also employed sub-treatments (Math and Games) to further explore effects of continuous cognitive practice (please see the full working paper for more details on their research design), to find the following:

- The act of effortful thinking alone has broad benefits—proxied by improved school performance across unrelated domains. On average, receiving cognitive practice mitigates performance decline in the second half of the test by 21.9%, with similar average effects across the Math arm (21.9%) and Games arm (22%).
- Effortful thinking changes a particular capacity: cognitive endurance. Control students, for example, exhibit significant cognitive fatigue: the probability of getting a given question correct declines by 12% from the beginning to the end of the tests on average.

The authors stress that their findings do not preclude the possibility that their treatments may have benefits through channels other than cognitive endurance that are not studied in this work. Even so, they view their two main sets of findings as offering complementary evidence on the potential link between schooling and generalized mental capacity. And those benefits likely extend beyond school. For example, the authors also document substantial performance declines among full-time data entry workers and among voters at the ballot box, with more severe declines among more disadvantaged populations. While only suggestive, the patterns provide impetus for additional work on cognitive endurance.

READ THE WORKING PAPER

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