



CENTRE FOR EDUCATION ECONOMICS

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Editor: Gabriel Heller-Sahlgren

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Editor's Pick

The Effect of Vietnam-era Conscription and Genetic Potential for Educational Attainment on Schooling Outcomes

By: Lauren L. Schmitz and Dalton Conley

Economics of Education Review (December 2017)

Published version

Working paper version (free)

The extent to which educational attainment is affected by genes and environmental factors is a hotly debated topic in social science and the public debate – exemplified by a recent row following Teach First's decision to **remove** a **blog post** by Toby Young of the Spectator and the New Schools Network. In the article, Young argued that genetic differences set limits for what schools can achieve in terms of raising pupil performance; Teach First's decision to pull the blog post indicates this topic's controversial nature.

While a large number of twin studies find that educational attainment is significantly **heritable**, as correctly highlighted by Young, they are routinely criticised for not taking into account potential interactions between heritable and environmental factors – which also have been shown to have important effects on children's outcomes.¹ If genes and environment factors interact in shaping outcomes, it may be possible to design interventions for pupils with different genetic predisposition towards educational attainment.

However, a key problem for investigations into causal interaction effects between genes and environmental factors is that they require both information on people's genetic composition and random variation in the environmental factor under investigation. Thus far, few studies have been able to combine these two ingredients.

However, this paper provides an interesting exception. While it does not study the impact of educational policy as such, it does investigate an environmental factor that is commonly assumed to affect educational attainment and life

¹ Research in the economics of education tends to find quite large positive effects of educational interventions – such as **class size**, **school funding**, and **school choice** – on long-term educational and labour-market outcomes. Also, research indicates that birth order, operating via environmental differences within families, including different **parental human-capital investments**, has an important impact on **adult intelligence** and **life outcomes** in general. It seems clear, therefore, that education and environmental factors have important effects on children's futures. The question under debate is rather *how much* these factors matter vis-à-vis genetic influences – and, more importantly for this review, to what extent there are interaction effects between genes and environmental factors.

outcomes: conscription service. Conscription service could affect people's outcomes negatively, for example if it interrupts or impedes educational progress, but it may also have positive effects, for example if it enhances human capital accumulation through the training received during service.

Specifically, the authors investigate the impact of conscription at the time of the Vietnam War. Since men were made eligible for being drafted into the army based on lottery outcomes, it is possible to extract random variation in the likelihood of being "treated" with conscription service during the war. This means that any impact on educational outcomes is due to conscription service – not because of unseen characteristics that affect both people's probability of going through conscription service and their educational level.

The authors use a polygenic score for respondents in the Health and Retirement Study, which also includes data on educational outcomes. The polygenic score aggregates thousands of single nucleotide polymorphisms across the genome and weights them in accordance with the strength in the association between them and educational attainment. This gives the authors a single scalar of genetic propensity for educational attainment – which they then use to study how genetic differences interact with conscription service in affecting educational attainment.

Importantly, the authors find that there are no differences in polygenic scores and other characteristics between draft eligible and ineligible individuals, indicating that the lottery did indeed induce random variation in the likelihood of serving in the military. This is crucial since they also find that people with lower polygenic scores – and therefore lower genetic propensity for educational attainment – are more likely to serve in the military in general.

The results show that Vietnam veterans with lower polygenic scores have lower educational attainment, measured by years of schooling and years of college. Draft eligible men with below-average polygenic scores completed about 3 fewer years of schooling and were about 70-90 per cent less likely to obtain a post-secondary degree. However, as people's polygenic score increases, this negative impact decreases until it disappears for people with above average polygenic scores. In other words, being drafted into the army due to chance only had a negative impact on educational attainment among people with a lower genetic propensity for educational attainment – but not among people with higher genetic propensity for educational attainment.

Overall, therefore, the study provides an interesting case of how genetic predispositions interact with environmental factors in affecting people's educational outcomes. Certainly, this does not prove that genes interact with schooling and educational interventions; we need research into this issue more specifically before drawing any conclusions in this respect. Still, the paper highlights ways in which such possible interactions could be rigorously analysed in the future.



Effects of Policy and Practice – Developed World

Does Money Matter in the Long Run? Effects of School Spending on Educational Attainment

By: David Hyman

American Economic Journal: Economic Policy (November 2017)

Published version (free)

This paper measures the effect of increased primary school spending on students' college enrolment and completion. Using student-level panel administrative data, the author exploits variation in the school funding formula imposed by Michigan's 1994 school finance reform, Proposal A. Students exposed to \$1,000 (10 per cent) more spending were 3 percentage points (7 per cent) more likely to enrol in college and 2.3 percentage points (11 per cent) more likely to earn a postsecondary degree. The effects were concentrated among districts that were urban and suburban, lower poverty, and higher achieving at baseline. Districts targeted the marginal dollar toward schools serving less-poor populations within the district.

School District Reform in Newark: Within- and Between-School Changes in Achievement Growth

By: Mark J. Chin, Thomas J. Kane, Whitney Kozakowski, Beth E. Schueler, and Douglas O. Staiger

NBER Working Paper No. 23922

Published version (free)

In 2011-12, Newark launched a set of educational reforms supported by a gift from Facebook CEO Mark Zuckerberg and Priscilla Chan. Using data from 2009 through 2016, the authors evaluate the change in Newark students' achievement growth relative to similar students and schools elsewhere in New Jersey. The authors measure achievement growth using a "value-added" model, controlling for prior achievement, demographics and peer characteristics. By the fifth year of reform, Newark saw statistically significant gains in English and no significant change in math achievement growth. Perhaps due to the disruptive nature of the reforms, growth declined initially before rebounding in recent years. Aided by the closure of low value-added schools, much of the improvement was due to shifting enrolment from lower- to higher-growth district and charter schools.

Shifting enrolment accounted for 62 per cent of the improvement in English. In math, such shifts offset what would have been a decline in achievement growth.

The Effects of Graduation Requirements on Risky Health Behaviours of High School Students

By: Zhuang Hao and Benjamin W. Cowan

Published version

Working paper version (free)

Previous studies have shown that years of formal schooling attained affects health behaviours, but little is known about how the stringency of academic programs affects such behaviours, especially among youth. Using national survey data from the Youth Risk Behavior Surveillance System (YRBS), the authors study the effects of mathematics and science high-school graduation requirements (HSGR) on high school students' risky health behaviours--specifically on drinking, smoking, and marijuana use. They find that an increase in mathematics and science HSGR has significant negative impacts on alcohol consumption among high-school students, especially males and non-white students. The effects of math and science HSGR on smoking and marijuana use are also negative but generally less precisely estimated. Our results suggest that curriculum design may have potential as a policy tool to curb youth drinking.

Can Learning Communities Boost Success of Women and Minorities in STEM? Evidence from the Massachusetts Institute of Technology

By: Lauren Russell

Economics of Education Review (December 2017)

Published version

Working paper version (free)

The author studies the impacts of a freshman learning community at MIT called the Experimental Study Group (ESG) which has features aligning with the National Academies' recommendations for expanding the representation and success of women and minorities in STEM fields. She exploits the lottery-based admission system to estimate causal treatment effects. She finds no statistically significant effects on academic outcomes for ESG enrollees generally, but women who participate in the program have higher GPAs and complete more credits of coursework. Minority students are more likely to major in math, computer science, or electrical engineering after participating in the program. Though quite noisy, the results are suggestive that women and minorities in STEM may benefit from learning communities.



Effects of Policy and Practice – Developing World

Low Wage Returns to Schooling in a Developing Country: Evidence from a Major Policy Reform in Turkey

By: Abdurrahman Aydemir and Murat G. Kirdar

Oxford Bulletin of Economics and Statistics (December 2017)

Published version

Working paper version (free)

In this paper, the authors estimate returns to schooling for young men and women in Turkey using the exogenous and substantial variation in schooling across birth cohorts brought about by the 1997 reform of compulsory schooling within a fuzzy regression discontinuity design. They estimate that the return from an extra year of schooling is about 7–8% for women and an imprecisely estimated 2–2.5% for men. The low level of the estimates for men contrasts starkly with those estimated for other developing countries. They identify several reasons why returns to schooling are low for men and why they are higher for women in our context. In particular, the policy alters the schooling distributions of men and women differently, thus the average causal effect puts a higher weight on the causal effect of schooling at higher grade levels for women than for men.

Enrolment without Learning: Teacher Effort, Knowledge, and Skill in Primary Schools in Africa

By: Tessa Bold, Deon Filmer, Gayle Martin, Ezequiel Molina, Brian Stacy, Christophe Rockmore, Jakob Svensson, and Waly Wane

Journal of Economic Perspectives (Autumn 2017)

Published version (free)

School enrolment has universally increased over the past 25 years in low-income countries. However, enrolling in school does not guarantee that children learn. A large share of children in low-income countries learn little, and they complete their primary education lacking even basic reading, writing, and arithmetic skills – the so-called ‘learning crisis.’ This paper uses data from nationally representative surveys from seven Sub-Saharan African countries, representing close to 40 per cent of the region's total population, to investigate possible answers to this policy failure by quantifying teacher effort, knowledge, and skills.

Averaging across countries, the paper finds that students receive two hours and fifty minutes of teaching per day – or just over half the scheduled time. In addition, large shares of teachers do not master the curricula of the students they are teaching; basic pedagogical knowledge is low; and the use of good teaching practices is rare. Exploiting within-student, within-teacher variation, the analysis finds significant and large positive effects of teacher content and pedagogical knowledge on student achievement. These findings point to an urgent need for improvements in education service delivery in Sub-Saharan Africa. They also provide a lens through which the growing experimental and quasi-experimental literature on education in low-income countries can be interpreted and understood, and point to important gaps in knowledge, with implications for future research and policy design.



General Education

The Non-Market Benefits of Education and Ability

By: James J. Heckman, John Eric Humphries, and Gregory Veramendi

NBER Working Paper No. 23896

Published version (free)

This paper analyses the non-market benefits of education and ability. Using a dynamic model of educational choice we estimate returns to education that account for selection bias and sorting on gains. The authors investigate a range of non-market outcomes including incarceration, mental health, voter participation, trust, and participation in welfare. They find distinct patterns of returns that depend on the levels of schooling and ability. Unlike the monetary benefits of education, the benefits to education for many non-market outcomes are greater for low-ability persons. College graduation decreases welfare use, lowers depression, and raises self-esteem more for less-able individuals.