

# Research explores the link between wages, school and cognitive ability in South Africa

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Studies through the decades have linked higher wages to education, with the greatest returns in developing countries. However, the correlation between higher wages and education doesn't always account for an individual's innate cognitive abilities, or the mental processes of gathering and processing information to solve problems, adapt to situations and learn from experiences.

How much of those wage gains come from schooling, and how much from [cognitive abilities](#) developed long before the student sets foot in a classroom?

Data on measures of cognitive performance have been limited historically, particularly in developing countries. Using data sets that only became available in recent years, Binghamton University Assistant Professor of Economics Plamen Nikolov, and graduate students, Nusrat Jimi and Jerray Chang, analyzed the wage impact of [cognitive skills](#) in "The Importance of Cognitive Domains and the Returns to Schooling in South Africa: Evidence of Two Labor Surveys" in the August 2020 edition of *Labour Economics*.

Economics research dating back to the 1970s links higher wages to more education; however, it wasn't until the 1990s that economists made headway in designing research that could tease out the true causes of such phenomena rather than just the correlation, Nikolov explained.

If non-experimental studies that explore the effects of education on

wages don't account for cognitive performance in addition to schooling, the wage effect of school alone will seem higher than it really is, he pointed out. While cognitive skills may be further developed in the classroom, previous economics and psychology research shows that most of these skills are developed before people start elementary school.

In addition to the innate cognitive factor, the quality of education can also impact wages. During the Apartheid period, schools in South Africa were race-based, with those of worse quality attended by Black South Africans; this system was dismantled in 1994, although disparities remain. Black South Africans often had substantially less education than their white counterparts as a result.

"It is possible that people who have better cognitive performance are likely either to do better in school or to get more schooling. In our estimation, our conceptual argument is that both cognition and schooling separately and distinctly exert a positive effect on wages," said Nikolov, the lead author, adding that the empirical analysis already accounts for other factors that could potentially affect wages, such as socio-economic factors.

## **Cognitive skills and wages**

The study used two surveys conducted between 2002 and 2014 in two distinct areas of South Africa: urban and rural. The surveys collected extensive household information, including dimensions of cognition: memory, orientation, numeracy and attention in one, and literacy and numeracy in the other.

Findings show that each additional year of school equates to an earnings increase of 18 to 20 percent. Returns are higher in the urban sector due to the preponderance of service-oriented and technical jobs, compared to rural South Africa, which has mostly low-paying agricultural work,

Nikolov said.

Urban and rural environments also show differences in which types of cognitive skills are rewarded, once again connected with the types of jobs available. In rural environments, memory and orientation—an awareness of one's time, place and person—are most important when it comes to higher wages. In more urban environments, earnings are connected with higher order cognitive skills, such as arithmetic, literacy and planning.

A standard deviation increase in cognitive skills—memory in rural areas and numeracy in cities—is roughly equivalent to one more year of school. However, an extra year of school in a developing country such as South Africa has double the rate of return as an equivalent year in a high-income country such as the United States, according to the research.

While cognitive skills may predate schooling, that doesn't mean that classrooms aren't a worthwhile investment for developing countries—quite the opposite, in fact.

"This [wage](#) effect implies that both cognitive skills and schooling matters, but schooling matters a lot more," Nikolov said.

**More information:** Plamen Nikolov et al, The Importance of Cognitive Domains and the Returns to Schooling in South Africa: Evidence from Two Labor Surveys, *Labour Economics* (2020). [DOI: 10.1016/j.labeco.2020.101849](https://doi.org/10.1016/j.labeco.2020.101849)

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