Social Science & Medicine 127 (2015) 181–189

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Schooling has smaller or insignificant effects on adult health in the US than suggested by cross-sectional associations: New estimates using relatively large samples of identical twins

Vikesh Amin [a, *], Jere R. Behrman [b], Hans-Peter Kohler [c]

[a] Department of Economics, Central Michigan University, Mount Pleasant, Michigan, MI 48859, USA
[b] Economics and Sociology, McNeil 160, 3718 Locust Walk, University of Pennsylvania, Philadelphia, PA 19104-6297, USA
[c] Demography, McNeil 272, 3718 Locust Walk, University of Pennsylvania, Philadelphia, PA 19104-6297, USA

ARTICLE INFO

Article history:
Available online 30 July 2014

Keywords:
Health
Schooling
Causal effects
Identical (monozygotic) twins estimators

ABSTRACT

Numerous theoretical reasons have been posited about why more schooling might improve health. Adult health outcomes and behaviors generally are significantly *associated* with schooling. However, such associations do not necessarily imply that schooling has causal effects on health outcomes and behaviors. Causal estimates based on schooling variation from policies and from within-MZ (monozygotic) twins have reached mixed conclusions. This study contributed new estimates of cross-sectional associations and within-MZ causal effects using three relatively large US twins samples. The estimates suggested that schooling was significantly associated with numerous health outcomes and behaviors. However, with within-MZ twins control for unobserved factors, schooling was no longer associated with most indicators of better health (with the exception of self-reported health), while it continued to be associated with outcomes such as fertility and spousal schooling. Similar patterns were observed for spousal schooling.

1. Introduction

More-schooled individuals tend to have better adult health outcomes and behaviors. Theoretical models postulate that these associations arise because schooling causally affects adult health through several mechanisms (Fig. 1): increasing incomes, and thus enabling purchasing better health care (particularly in the US and similar institutional contexts); improving one's rank in society, which is associated with better adult health and reduced stress and poor mental health related to actual and/or perceived social deprivation (Rose and Marmot, 1981); increasing interactions with other more-schooled peers, generating health spillovers (Fletcher, 2010); lowering discount rates and extending life expectancies, thereby making individuals more patient and increasing their incentives to engage in healthier behaviors (Becker and Mulligan, 1997); increasing productive efficiency to produce more health from given inputs (Grossman, 1972); and increasing allocative efficiency through selecting inputs better for health production (Grossman, 1972). While these mechanisms suggest that schooling improves health, some pathways can operate in the opposite direction. For example, higher earnings caused by more schooling increases opportunity costs of time, which may adversely affect health as many health inputs are time-intensive (e.g., doctor visits, exercising). Yet, most theoretical discussions argue that the pathways resulting in positive effects of schooling on health dominate such adverse possibilities.

Given the multitude of mechanisms through which schooling can potentially affect adult health (Fig. 1), schooling and schooling-related socioeconomic differences have been characterized as '***fundamental causes***' of adult health and societal health disparities' (Link and Phelan, 1995).

However, it is important to emphasize that the frequently-observed empirical associations between schooling and health do not necessarily reflect causal relationships postulated by the above theories. These empirical associations could be confounded by unobserved genetic and social endowments at the bottom of Fig. 1 such as (parental/own) preferences, abilities, cognitive functioning, parental economic/social resources that jointly affect schooling and adult health. For example, Cutler and Lleras-Muney (2010) found that 20 percent of the schooling-health gradient was driven by cognitive ability. Moreover, there is also possibly reverse causation, insofar as health (particularly early life health) affects schooling (Currie and Stabile, 2006; Royer, 2009).

* Corresponding author.
E-mail addresses: amin1v@cmich.edu (V. Amin), jbehrman@econ.upenn.edu (J.R. Behrman), hpkohler@pop.upenn.edu (H.-P. Kohler).

http://dx.doi.org/10.1016/j.socscimed.2014.07.065
0277-9536/

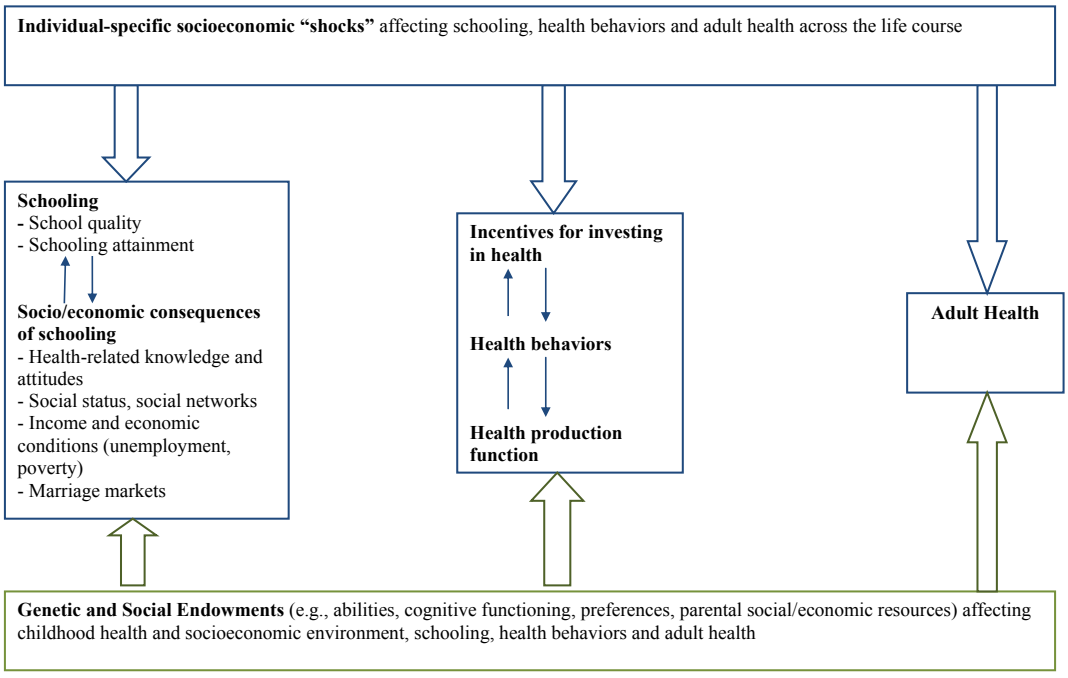

Fig. 1. Conceptual theoretical framework between schooling and health.

Several recent studies have used schooling variation arising from policy changes, e.g. compulsory schooling laws, to estimate causal effects of schooling by using such changes as instrumental variables (IV) or employing regression discontinuity (RD) designs (comparing schooling and health outcomes of individuals just before and just after reforms). These studies, summarized below, have found mixed results; large significant effects in some cases and small or insignificant effects in others.

An alternative strategy to using policy-induced schooling variation is to use variation in schooling within MZ (monozygotic; identical) twin pairs. MZ twins share the same genetic makeup and family-rearing environment. By relating twin-pair differences in health to twin-pair differences in schooling, schooling effects on health are estimated controlling for unobserved factors that affect schooling and health of both twins such as the genetic and social endowments in the bottom of Fig. 1. In contrast to a substantial literature using twins data from European countries and Australia, only two published studies applied this within-MZ twins approach to US data. Both Fujiwara and Kawachi (2009) and Lundborg (2013) used 1995 Midlife in the United States Survey (MIDUS) data on 694–701 MZ twins. Both studies found no significant effects of schooling on health outcomes (self-reported health, perceived mental health, number of chronic conditions, body mass index/BMI) and behaviors (smoking, exercise). Lundborg (2013), however, found significant positive impacts of schooling on self-reported health and negative impacts on number of chronic conditions when using dichotomous schooling indicators for high school, some college and college degree instead of continuous schooling measures.

The present study provided more evidence of schooling health-gradients using within-MZ twins methodology and much larger US twin datasets than in MIDUS: the Mid-Atlantic Twin Registry, Minnesota Twin Registry and NAS-NRC Twin Registry of WWII Military Veterans. These new explorations with larger samples permitted assessment of whether the mostly insignificant results reported in the previous US twins studies were in part artifacts of relatively small samples. We found that more schooling was associated cross-sectionally with better health outcomes and behaviors, consistent with much previous literature and most theoretical pathways through which schooling is hypothesized to affect health as discussed above. However, after controlling for unobserved social/genetic endowments in the bottom of Fig. 1 through within-MZ twins estimators, there generally was no association between schooling and health with the exception of self-reported health (though not to the extent that cross-sectional associations suggested). There remained associations in within-MZ analyses between schooling and fertility or spousal schooling, indicating that the lack of associations between schooling and health was not primarily driven by inadequate power for within-MZ analyses to detect associations between schooling and important life-course outcomes. Finally, we investigated whether there were positive spillovers of spousal schooling on own health. We found that spousal schooling was associated cross-sectionally with better own health outcomes and behaviors, but not within-MZ twin pairs.

2. Previous studies

Several studies examined schooling-mortality gradients in developed economies, with mixed results. Lleras-Muney (2005) used compulsory schooling laws as an IV, and found that an extra schooling grade reduced 10-year mortality rates for US whites by 60 percent. Mazumder (2008), however, showed that this conclusion was not robust to inclusion of state-specific trends. RD estimates showed that schooling had no effect on mortality between age 46–69 in the UK (Clark and Royer, 2013) and on survival rates at ages 50 and 80 in France (Albouy and Lequien, 2009). However, schooling was found to reduce probabilities of dying between age 81–88 by 4–6 percent in the Netherlands (van Kippersluis et al., 2011). Meghir et al., (2012) found that a Swedish schooling reform led to declines in male mortality at ages 40–49, which was offset by higher mortality at ages 50–59 – but with no effect overall on mortality up to age 60.