



Heterogeneity in the impact of type of schooling on adult health and lifestyle



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ABSTRACT

Using data from a major educational reform in England and Wales, we examine heterogeneity in the long-term impacts of the exposure to different secondary schooling systems, characterized by selective early-tracking system versus non-selective comprehensive schooling, on health outcomes and smoking. We adopt a local instrumental variables approach to estimate person-centered treatment (PeT) effects, thereby recovering the full distribution of individual-level causal effects. We find that the transition from a selective early-tracking system to a non-selective one produced, on a fraction of individuals, significantly increased depression and cigarette smoking. These effects were persistent over time. Cognitive abilities did not moderate the effects, but students with lower non-cognitive skills were most likely to be negatively affected by this exposure.

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The positive health gradient by years of schooling is a particularly robust empirical regularity. Several papers have examined the causal nature of this relationship by exploiting changes in compulsory education laws, such as Lleras-Muney (2005), Kenkel et al. (2006), Oreopoulos (2006), Grimard and Parent (2007), Silles (2009), Van Kippersluis et al. (2011), Oreopoulos and Salvanes (2011) and Clark and Royer (2013). While the magnitude of the estimated health effects varies considerably among these studies,¹ in general, they tend to find positive long-term mean effects of post-compulsory years of education on longevity, health-related behaviors, and outcomes. This body of evidence has inspired some policy interventions targeting young children and adolescents in

various parts of the world (e.g., The Quebec Educational Program; Best Start for Kids in King County, Washington).

Nonetheless, as made clear in Clark and Royer (2013), other key aspects of the association between education and health have received much less attention. First, most of the available evidence concerns the effects of length of schooling, rather than the type of that education; this leaves aside all qualitative aspects of an educational system, such as conditions of access, tracking, resources and educational environment. For example, there is a large literature that has looked at the impact of assimilation and also segregation of children from different cultural, socio-economic, and racial backgrounds on their long-term outcomes (Borjas 1985; Fordham and Ogbu 1986; Cutler and Glaeser 1997; Guryan 2004; Card and Rothstein 2007; Echenique et al., 2006). More recently, the effects of assimilation of abilities (cognitive and non-cognitive), independent of other factors, have become a focus of attention. Ability tracking within schools, where high ability students are grouped in separate classes within the same school, have found better results from both high ability and low-ability students. For example, recently Card and Giuliano (2014) found that establishing separate “gifted/high achiever” classrooms for fourth and fifth graders leads to significant achievement gains for non-gifted but high-achiever participants in those classrooms. Beyond ability tracking, mixing of abilities within a school has found mixed results. Kang et al. (2007) exploited a

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¹ These studies use different data, obtain identification from distinct policy reforms and employ different methodologies, hence their results are not directly comparable. Nonetheless, Clark and Royer (2013) find much smaller effects of post-compulsory years of schooling on longevity than Lleras-Muney (2005) and Van Kippersluis et al. (2011). The possible reasons for this, as well as the limitations of the different studies, are discussed in detail in Clark and Royer (2013).

policy experiment in South Korea in 1970 and found that ability-mixing compared to ability-grouping in high school had a positive but statistically insignificant effect on average adulthood earnings. However, this effect was larger for lower ability students and lower, even negative, for higher ability students. Understanding the impact of such mixing of abilities, not only based on cognitive dimensions but also on non-cognitive abilities, on long-term health and lifestyle choices has remained largely unexplored.

In this paper, we try to fill this gap in evidence through three main channels. First, we exploit the implementation of a major education reform in England and Wales that, rather than increasing the school leaving age, exposed pupils of the same age cohort to qualitatively different secondary schooling systems. Geographic variation in the pace that comprehensive schools were introduced in England and Wales means that one group was exposed to a selective early-tracking system in which children took a test to determine whether they were given the opportunity to enroll in an academically intensive secondary school (called ‘grammar schools’) or else into a less academic secondary school (called ‘secondary modern schools’). Another group was exposed to a non-selective system, under which testing was abolished and where all pupils, with varying abilities, attended the same type of schools (called comprehensive schools). This allows us to examine the effect of exposure to qualitatively different educational systems, which did vary regarding the curriculum a median student was exposed to and the distribution of teacher characteristics, and importantly, allowed different levels of assimilation of abilities among the students, on health and lifestyle in adulthood. Non-pecuniary effects of exposure to different types of secondary school systems have been postulated to be sizable in the education sciences and psychology literature (Dupriez et al., 2008; Perkins and Graham-Bermann, 2012) but have received less attention in the economics literature.

Second, we examine the patterns of heterogeneity of effects on health and lifestyle of the exposure to qualitatively different educational systems. Conti et al. (2010, 2011) and Heckman et al. (2014) have used longitudinal data from the UK and the US to characterize heterogeneity health returns to post-compulsory education. Thus, as in Heckman et al. (2014), we adopt an instrumental variables identification strategy and estimate person-centered treatment (PeT) effects (Basu 2014) of selective over non-selective schooling system, thereby recovering the full distribution of the effects and identifying gainers and losers from this policy across the lifecycle.

Third, we examine the roles of cognitive and non-cognitive ability in childhood as possible moderators of the heterogeneity of the estimated effects. Using Dutch data, Bijwaard et al. (2013) has recently shown that cognitive ability can be an important moderator of heterogeneity in the health returns to different lengths of schooling.

We use data from the National Child Development Study (NCDS), which follows a cohort of around 17,000 individuals from their birth in the week of 3rd March 1958. The NCDS cohort-members went through secondary schooling during the 1970s and attended different types of school since their secondary schooling lay within the transition period of the comprehensive education reform that was implemented in England and Wales from the mid-1960s.² This reform restructured secondary education by replacing the former system of early tracking of students with a non-selective, comprehensive, educational system. Comprehensive schooling was not implemented simultaneously across the country, and hence only some cohort members attended the selective system of state-funded education, which comprised grammar schools, secondary

modern schools and a small number of technical schools. Among members of the NCDS cohort as a whole, 12 percent attended grammar schools at age 16, 25 percent attended secondary moderns, and 57 percent attended comprehensive schools. An additional 6 percent attended private fee-paying schools, independent of the state educational system and reforms.³

Previous evaluations of the comprehensive schooling reform have focused largely on their direct impact on educational attainment and indirect impact on labour market outcomes (Kerkchoff et al., 1996; Jesson, 2000; Dearden et al., 2002; Galindo-Rueda and Vignoles, 2005; Bonhomme and Sauder, 2011; Burgess et al., 2014). While earlier work that investigated health outcomes used a matching approach and focused on average effects rather than evidence of heterogeneity in responses to the reform (Jones et al., 2011). Here we focus on heterogeneous responses in health-related behaviors and health outcomes.

Our results indicate that there is substantial heterogeneity in the effects of the reform and significant persistence of these effects over time at the individual level. Compared to the selective system of schooling, the newer comprehensive schooling system produced significant negative effects on long-term health and increased smoking among a fraction of individuals. However, the ATE and TT were quantitatively similar and statistically insignificant indicating that cognitive abilities, which were the major drivers for selection into comprehensive schools, did not moderate the effects. Analyzing the PeT effects shows that individuals who had lower non-cognitive skills are most likely to be negatively affected in the long-run from exposure to mixed-ability schools. Our results also show that cigarette smoking could be an important transmission channel of the long-term impact on health outcomes.

1. The comprehensive education reform

As Kerkchoff et al. (1996: 1–2) describe it, following the Second World War, a cycle of educational reforms was initiated in Western Europe. This was characterized by a move away from older selective systems and towards unified, non-selective, systems of comprehensive schooling. From the mid-1960s the comprehensive reorganization took-off in England and Wales, and aimed at promoting equal opportunity in society through an improvement of the quality of the schooling accessible to children from disadvantaged backgrounds. It replaced the selective educational system with a non-selective, comprehensive system of secondary schooling. This policy reform was implemented at different speeds at the local level: some Local Education Authorities (LEAs) implemented it quickly, but others resisted the change. This gradual and uneven transition allowed the two systems to co-exist for a long period.

The NCDS cohort entered state secondary schools at age 11 in 1969 and completed their compulsory schooling at age 16 in 1974; at that point, among those who attended state schools 40 percent of the cohort members still experienced the selective system, while the remaining 60 percent attended comprehensive schools. The NCDS cohort-members who still experienced the selective system attended either ‘grammar schools’ or ‘secondary modern’ ones. Grammar schools were academically oriented state schools that provided teaching for the entire age range 11–18 and prepared pupils to go on to higher education. Admission into these schools was determined by an exam taken at age 11 (the ‘Eleven Plus’).⁴

³ This subsample is thus not used in our analysis.

⁴ The earliest comprehensive schools in England and Wales were set up after the Second World War. But the large expansion of comprehensives followed from the policy adopted by the Labour government in 1965. This was implemented through an instruction to local education authorities (LEAs) to plan to convert their schools to comprehensives. In 1970 the new Conservative government, ended the compulsion

² Comprehensive schooling was introduced in Scotland much earlier than in England and Wales, preventing the use of the Scottish sub-sample as an adequate comparison group for types of school and educational qualifications.

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