Does Reducing Early School Tracking Affect Health Behaviors?

By Serena Canaan*

Higher educational attainment is strongly associated with better health outcomes. Additionally, women's life expectancy has been consistently higher than men's since the beginning of the twentieth century (Goldin and Lleras-Muney, 2019). Disparities in health behaviors such as smoking, diet and access to preventive care are key determinants of differences in health outcomes (Cutler and Lleras-Muney, 2010).

A long body of empirical work has examined the causal link between education and health (see Galama et al., 2018). Previous studies mostly focus however on *quantity* of education, as they evaluate the health implications of reforms that increased the minimum compulsory school leaving age.[1]

This paper studies instead the impacts of a change in the *quality* of education at an early age on long-term health behaviors, and whether these effects vary across men and women. Specifically, I examine the impacts of a French reform which essentially delayed the age at which middle school students are tracked into academic versus vocational education. Tracking is the prevalent practice of separating students into achievement-based tracks or classrooms. In many European countries, students are divided into tracks that substantially differ in terms of curricula (academic versus vocational), degrees and career options. While tracking is widespread, there is limited evidence on how it affects long-term health behaviors.[2]

Prior to the French reform, middle school students were separated into academic and vocational tracks at age 11. The academic track prepared students for eventually enrolling in universities. On the other hand, vocational education offered training in occupation-specific skills, with the aim of allowing students to incorporate the labor market immediately after high school. The reform, implemented in the academic year 1977-78, delayed tracking by two years and introduced a common academic curriculum.

Using a regression discontinuity design based on date of birth, I find that the reform significantly increases on-time preventive screening for chronic illnesses at age 47. Both men and women are more likely to get cholesterol and glycemic index tests at the frequency recommended for their age. On the other hand, it does not affect women's use of gynaecological preventive screenings such as mammograms and pap smears. The reform also does not impact health behaviors that are associated with higher level of mortality such as smoking, alcohol consumption, diet, exercise and obesity.

I. Institutional Background

Children in France first enroll in mandatory primary education in September of the year in which they turn six, and are required to spend five years in primary schools. Before the reform, students were placed in different tracks starting their first year of middle school (at around age 11) and based on their prior academic performance. The tracks differed substantially in their curricula, as well as their educational and career outcomes.

Low-achieving students were placed in the vocational track and were offered a combination of general education and vocational courses with on-the-job training. Vocational degrees were designed to help students incorporate the labor market after high school graduation. High-achieving students were instead placed in an academic track, which provided access to post-

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[1] See for example, Lleras-Muney (2005); Clark and Royer (2013).

[2] The few studies linking school tracking and health focus on health outcomes such as mortality and hospitalizations and not on health behaviors (e.g., van Kippersluis et al., 2011).

Table 1—Summary Statistics

	All (1)	Men (2)	Women (3)
Had cholesterol screening in last 5 years	0.836	0.807	0.862
	(0.371)	(0.395)	(0.345)
N	962	455	507
Had glycemic index test in last 3 years	0.790	0.734	0.842
	(0.407)	(0.443)	(0.365)
N	964	458	506
Had blood pressure test in last year	0.769	0.708	0.824
	(0.422)	(0.455)	(0.382)
N	966	456	510
Had pap smear in last 3 years	-	-	0.822
			(0.383)
N			510
Had a mammogram in last 2 years	-	-	0.602
			(0.490)
N			512

Note: This table reports means, standard deviations (in parentheses) and number of observations (*N*) for key outcomes. Column (1) includes all individuals who are born within 20 months on either side of the January 1, 1966 cutoff. Columns (2) and (3) restrict the sample to men and women, respectively.

secondary education. Within the academic track, students typically followed four years of common middle school education and then were tracked again at the beginning of high school in either academic or technical tracks. The academic high school track allowed students to eventually enroll in universities, while technical degree holders could enroll in two-year postsecondary technical institutes after which they can work as senior technicians or technologists.

The Haby reform, which was implemented starting the academic year 1977-78, was meant to unify middle school education. It introduced a common academic curriculum for all four years of middle school. However, low-achieving students could still be placed in vocational education after two years. Additionally, middle schools responded to the reform by grouping students into ability-based classrooms. By 1980, less than half of middle school classes were mixed-ability. The reform did not change the minimum compulsory school leaving age nor the number of years required to obtain high school degrees. In summary, the reform did not completely abolish tracking but instead it (i) delayed it until age 13 and (ii) replaced the division into vocational and academic tracks with grouping students into classrooms based on prior academic achievement. Canaan (2020) shows that the reform increased both men and women's level of education by decreasing the share of individuals with vocational degrees and increasing the likelihood of holding technical degrees—implying that it reduced the share of students placed in vocational education. The reform was also found to increase earnings at age 45, especially for men.

II. Data

My analysis uses data from the 2014 "Enquête Santé et Protection Sociale". This is a household survey administered to individuals aged 15 years and above, and is representative of 97% of the French population. It includes information on health outcomes, access to care and health coverage. I observe outcomes of individuals in my main sample when they are aged around 47. The survey includes information on individuals' month and year of birth and a number of baseline covariates such as gender and parental education. It does not however have information on whether individuals were tracked at age 11.

Summary statistics for all individuals in my main sample are reported in column (1) of Table 1. Columns (2) and (3) split this sample by men and women, respectively. The first set of outcomes reflect whether individuals get preventive screening for common chronic health conditions,

with the frequency recommended for their age group. Around 80% of individuals in my main sample get preventive screening *on time*. Women are more likely to do so than men: 86% report having had a cholesterol test within the last 5 years versus 80.7% of men, 84% had a glycemic index test (for diabetes detection) within the last 3 years versus 73.4% of men and, 82% of women versus 70.8% of men have a yearly blood pressure test. For women, I can also observe whether they had their routine genealogical screenings: 82% of women in my main sample report having had a pap smear in the last 3 years, and 60% had a mammogram in the last 2 years. Online Appendix Table A1 shows means for health behaviors that are typically associated with increased mortality rates.[3] Women have consistently better health behaviors as they are less likely to smoke, drink, suffer from obesity and more likely to consume vegetables, fruits and exercise. These gender disparities in health behaviors and preventive screening are in line with women having higher life expectancies than men in OECD countries.

III. Empirical Strategy

The identification strategy leverages the facts that (i) all students born in the same year first start school in the same academic year, (ii) prior to the reform, children were tracked at age 11 after having spent five years in primary school and, (iii) the reform was first implemented in the academic year 1977-78. This implies that individuals born on or after January 1, 1966 were affected by the reform (and tracked at age 13) while those born before that date were not (and tracked at age 11). This allows me to use a regression discontinuity design (RDD) comparing outcomes of individuals marginally born on either side of this date of birth cutoff.

Formally, I estimate the following local linear reduced form regression:

$$Y_i = \beta_0 + \beta_1 D_i + \beta_2 R_i + \beta_3 R_i \times D_i + X_i^{'} \beta_4 + \epsilon_i,$$

where Y_i is the outcome of interest for individual i, D equals 1 if an individual is born on or after the January 1, 1966 cutoff and 0 otherwise, R is the running variable which is defined as month-year of birth relative to the cutoff, and ϵ_i is the error term. X is a vector of baseline covariates which include month of birth fixed effects, dummy variables for whether the individual is female and whether their father and mother have less than a high school degree. R and D are interacted to allow for differential slopes on either sides of the cutoff.

β_1 is the coefficient of interest and captures the intent-to-treat (ITT) effects of the reform on health behaviors and preventive care, since I do not have data to estimate the first stage (i.e., whether individuals were tracked at age 11). I use a triangular kernel and the robust data-driven procedure introduced by Calonico, Cattaneo and Titiunik (2014) to choose the optimal bandwidth of 20 months.[4] Robust standard errors are reported throughout.[5]

IV. Results

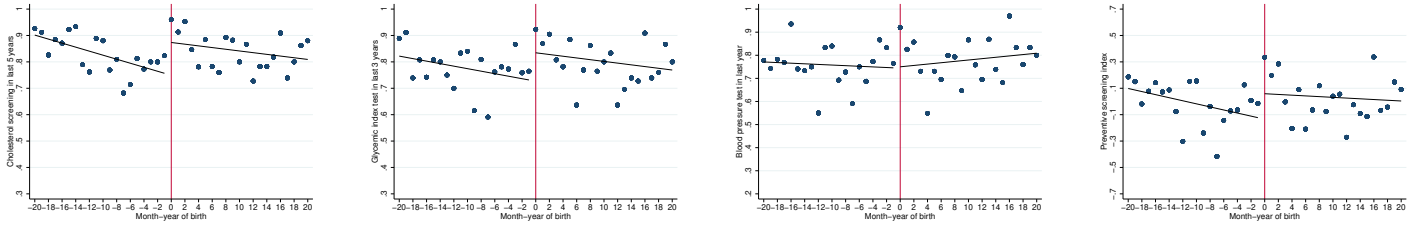
Panel (a) to (c) of Figure 1 provide visual evidence of the impact of the reform on on-time preventive screening for chronic illnesses. Specifically, each panel plots an outcome of interest as a function of individuals' month-year of birth relative to the cutoff. The figures show a positive discontinuity for the likelihoods of having a cholesterol screening test done in the past five years and having a glycemic index test done in the past three years, while no visible discontinuity is apparent for the likelihood of

[3] 27% of all individuals around the cutoff report smoking daily while 9.5% consume alcohol on a daily basis. Concerning diet and exercise, 15% of the sample are obese, 58% report not eating fruit and vegetables every day and 49% do not exercise at all.

[4] The optimal bandwidth varies depending on the outcome. For consistency, I use the bandwidth of 20 months for all outcomes and report estimates across other bandwidths in online Appendix Table A5.

[5] I perform two formal tests of validity of the RDD to rule out manipulation of the running variable. Online Appendix Figure A1 shows that there is no discontinuity in the density of the running variable. Online Appendix Table A2 further shows that there are no significant effects of being just above versus just below the cutoff on baseline covariates.

Figure 1—Effect of the Reform on Preventive Screening for Chronic Illnesses



(a) Had cholesterol screening (b) Had glycemic index text (c) Had blood pressure test (d) Preventive screening index

Note: The different panels show preventive screening outcomes, as a function of the distance of individuals' month-year of birth from the cutoff. Circles represent each outcome's average over a one month range. The fitted regression lines are taken from specifications with a bandwidth of 20 months.

doing a yearly blood pressure test. Corresponding RDD estimates reported in column (1) of Table 2 are consistent with this pattern. Individuals born just after the reform's birth cutoff are 15.1 p.p. and 12.5 p.p. more likely to have cholesterol and glycemic index tests, respectively. On the other hand, no statistically significant effect is detected for having a blood pressure test. Following Kling et al. (2007), I group all three outcomes in a "Preventive screening index".[6] Panel (d) of Figure 1 shows a discontinuity at the cutoff in the index, and the corresponding RD estimate in Table 2 is statistically significant and on the order of 0.24. Results, reported in columns (2) and (3) of Table 2, are similar for men and women, as they both experience increases in preventive care due to the reform.

Table 2 further shows no significant effects on an index that groups preventive screening for chronic illnesses with gynaecological screening outcomes (i.e., having a pap smear in last 3 years and a mammogram in last 2 years) for women. Finally, the last row of Table 2 shows that the reform had no significant effect on a "health behavior index", which groups individual health behavior outcomes (i.e., the likelihoods of smoking daily, drinking daily, being obese, not eating fruits or vegetables daily and not exercising).[7]

V. Conclusion

This paper examines whether a French reform, that delayed tracking students into academic versus vocational education from age 11 to 13, affects health behaviors and preventive care. Using a regression discontinuity design, I show that the reform significantly improved the likelihood of getting on-time preventive screening for chronic illnesses at age 47. The reform has however no significant impact on health behaviors that are typically predictive of higher mortality rates (such as smoking, drinking and diet/exercise). Effects are consistent across men and women, suggesting that changes in the quality of education at an early age do not contribute to gender gaps in health behaviors or access to preventive care.

Why would reducing early school tracking affect long-term preventive care? While it is beyond the scope of this paper to answer this question, there are several potential mechanisms at play. Canaan (2020) shows that the reform increased individuals' likelihood of graduating with technical rather than vocational degrees, and

[6]This index is computed by first standardizing each individual outcome (using control group's mean and standard deviation) and then taking an equally weighted average of these standardized outcomes. If an individual has missing values in some of the individual outcomes, I impute the missing values at the treatment group's mean.

[7]In online Appendix Table A3, I show that the reform has no significant effects on individual health behaviors. Appendix Table A4 further shows that my main results are consistent with those taken from RDD regressions with no controls and month of birth fixed effects. Appendix Table A5 shows that RDD estimates for the health behavior and preventive screening indices are robust across different bandwidths. Finally, Appendix Table A6 shows that there are no significant effects on main outcomes of being just above and just below the placebo cutoff of January 1, 1964.

Table 2—Effects of the reform on health behavior and preventive screening

	All	Men	Women
	(1)	(2)	(3)
Had cholesterol screening	0.151***	0.177**	0.127*
	(0.052)	(0.079)	(0.069)
N	962	455	507
Had glycemic index test	0.125**	0.139	0.123*
	(0.056)	(0.087)	(0.073)
N	964	458	506
Had blood pressure test	0.020	0.028	0.009
	(0.057)	(0.091)	(0.073)
N	966	456	510
Preventive screening index	0.243**	0.281*	0.212
	(0.108)	(0.167)	(0.143)
N	984	467	517
Preventive screening index	–	–	0.149
with OBGYN	–	–	(0.122)
N	–	–	517
Health behaviors index	-0.025	-0.010	-0.021
	(0.076)	(0.114)	(0.099)
N	984	467	517

Notes: Each cell reports the reduced form estimate of the impact of the reform on the corresponding outcome. Estimates are taken from separate local linear RD regressions using a triangular kernel. Column 1 includes all individuals born within 20 months on either side of the January 1, 1966 cutoff. Columns 2 and 3 respectively restrict the sample to men and women. Robust standard errors are reported in parentheses. Regressions include month of birth fixed effects, dummy variables for whether the individual's father and mother have less than a high school degree and a dummy variable for whether the individual is female (except columns 2 and 3).

raised their earnings in their 40s. Increases in earnings could directly impact access to preventive care as individuals have more resources and potentially better access to health insurance. This is however unlikely to fully explain the documented effects, especially since France offers universal healthcare. Other explanations are that increasing individuals' level of education might improve their access to information and cognitive skills, change their preferences, as well as alter their social networks (Cutler and Lleras-Muney, 2010).

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