Education and Smoking: Were Vietnam War Draft Avoiders Also More Likely to Avoid Smoking?[1]

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Revised, June 2006

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Abstract

We use the Vietnam War draft avoidance behavior documented by Card and Lemieux (2001) as a quasi-natural experiment to infer causation from education to smoking and find strong evidence that education, whether measured in years of completed schooling or in educational attainment categories, reduces the probability of smoking at the time of the interview, more particularly the probability of smoking regularly. However, while we find that more education substantially increases the probability of never smoking, there is little evidence that it helps people stop smoking, although the estimates are fairly imprecise. Potential mechanisms linking education and smoking are also explored.

1 Introduction

Since the release of the 1964 Surgeon General Report on smoking and health, people have become increasingly aware of the dangers related to tobacco consumption. For instance, smoking prevalence among men fell from 52 percent in 1965 to 26 percent in 2000 (U.S. Department of Health and Human Services 2000, 2002, 2004). Yet, despite the expansion of scientific knowledge about the health hazards of smoking, the various public health campaigns waged by governments, and the numerous regulatory measures against tobacco, there is still a sizable fraction of the population smoking at least occasionally. Given that people typically start smoking regularly rather early in life and that the addictive nature of cigarette smoking makes it difficult for many to subsequently stop, any policy that results in more people never picking up the habit would have significant consequences in terms of public health.

One such factor that is associated with a much lower prevalence of smoking is education: economists have long observed a positive relationship between education and health levels in many instances (Grossman (1972), Sander (1995), Chaloupka (1991)). Indeed, this link between education and health is not specific to tobacco consumption. Education and health have long been recognized as important factors in human capital accumulation associated with a rise of living standards of individuals throughout the world.

Yet, much like in the economics of education literature, where the strong positive correlation between earnings and educational attainment has been under intense scrutiny over the last two decades, there is some disagreement as to whether the relationship between education and health outcomes in general, and smoking in particular, is causal or not. There is a body of the literature claiming that the correlation is due to other factors. In particular, Fuchs (1982) and Farrell and Fuchs (1982) have argued that the missing element is the rate of time preference: those with a low discount rate will tend to invest more in health and in education. Others have minimized the importance of the discount factor. For instance, based on their assessment of the literature, Grossman and Kaestner (1997) conclude that the relationship between schooling and health outcomes does seem to reflect a causal mechanism.

This paper does not attempt to perform this task. Rather, we pursue the more modest goal of trying to identify a causal relationship from education to cigarette smoking. Given that Grossman

(2000) recognizes "the difficulties of establishing causality in the social sciences where natural experiments rarely can be performed", we analyze a presumably unforeseen consequence of a specific event in the recent history of the United States. With data from the Current Population Survey Tobacco Supplements, we use the Vietnam War draft avoidance behavior documented by Card and Lemieux (2001) and (2002) as a quasi-experiment to infer causation from education to smoking. We find strong evidence that education, whether it be measured in years of completed schooling or in educational attainment categories, reduces the probability of becoming a smoker, more particularly the probability of smoking regularly at the time of the interview. Interestingly, however, while we find that more education substantially increases the probability of never smoking, our other main finding suggests that increased education has a very limited impact, if any, on smoking cessation behavior. Overall, our results provide evidence that that education generates important health-related benefits.

Our identification strategy is to assume that the cross-cohort difference in smoking between US white males and females follows a smooth-enough trend and that any departure between 1945 and 1950 from that slowly evolving difference will be attributed to the extra education induced by the draft avoidance behavior. For validation and comparison purposes, we also perform the estimation either by using different groups or by making less restrictive identifying assumptions. First, we perform the estimation using the non-veteran males only. The identification of a treatment effect then rests entirely on the assumption that the independent effect of age for males is sufficiently smooth. Second, we exploit the information contained in the National Health Interview Surveys on health limitations prior to reaching the age at which one becomes eligible for Armed Forces service to instrument both educational attainment and veteran status. Finally, given the possibility that males and females may have reacted differently to the release in January of 1964 of the Surgeon General's report on smoking, we perform a falsification analysis. We use data from Canada's 1994 and 1999 National Population Health Surveys (NPHS) to verify whether our results can be replicated in an environment in which they should not be present. The checks we perform support our initial findings that education plays an important role in convincing people never to smoke, and that it somehow contributes less to smoking cessation. [1]

[1] Also, subsequent to our original working paper (Grimard and Parent (2003)) De Walque (2004) performed a similar analysis using a variant of the identification strategy proposed in this paper with a different data set. The major difference between his results and ours is that we do not find much evidence that more education makes people

In the final section of the paper we briefly explore the issue of the mechanisms by which more education translates into a lower propensity to start smoking. We find evidence supportive of the view that peer effects are likely to be a major determinant of smoking behavior relative to the improved information processing capabilities generated by increased educational attainment.

2 Previous Literature

The Surgeon General's Reports on the Health Consequences of Smoking (U.S. Department of Health, Education, and Welfare (1964), U.S. Department of Health and Human Services 1998, 2000, 2001) provide compelling evidence that smoking increases mortality due to heart disease, cancer and chronic obstructive pulmonary diseases.[2] In concluding their extensive survey, Chaloupka and Warner (2000) point out that "the use of tobacco, and particularly cigarette smoking, constitutes one of the great public health plagues of the latter half of the twentieth century, and one sure to define much of the global health status far into the 21st century as well."

The literature has made progress towards a better understanding of the determinants of smoking behavior. Prices and income obviously affect the demand for tobacco but their influence is modified by the addictive nature of tobacco.[3] Yet, while prices and income are obvious determinants of tobacco consumption, their effects appear relatively limited, as most studies report low elasticities (if significant at all, Chaloupka and Warner (2000)). Consequently, many public health analysts suggest that an additional benefit of restricting smoking would be to lower health care costs and have emphasized a combination of factors besides tax increases to favor smoking cessation and a reduction in starting smoking (Moore and Hughes (2000)).

quit smoking. In this version we provide a variety of specification checks to test the sensitivity of our results to different identifying assumptions. The main conclusion that more education makes people less likely to start smoking but not more likely to stop survives all those specification checks.

[2]Mortality increases with quantity smoked and length of smoking career. It increases with tar and nicotine levels. However, mortality decreases following cessation or reductions in quantity smoked, particularly among healthy quitters. In addition, smoking exhibits similar effects on morbidity (Moore and Hughes (2000)).

[3]Most of the literature modeled addiction as habit formation until Becker and Murphy (1988) introduced a rational addiction framework where individuals recognize the addictive nature of choices that they make, but may still make them because the gains from the activity exceed any costs through future addiction. Empirically, the rational addiction model implies that consumption of addictive goods today depends on past and future consumption and as such future higher prices lead to lower consumption today. This implication has been consistently reported in numerous papers (e.g. Becker et al. 1991 and 1994, Chaloupka and Warner (2000), Gruber and Koszegi (2001)), which has led to a general acceptance of the rational addiction modeling framework (although see Gruber and Koszegi (2001) for a modification of the framework incorporating time-inconsistent preferences, leading to different normative implications).

Another factor which appear to exert an important influence on smoking behavior is education. For instance, numerous studies report that high school dropouts are much less likely to have never smoked, while those who have some schooling beyond high school and/or college are more likely to have never smoked or, if they did smoke at one time, are more likely to have subsequently quit. Two main explanations for the relationship between education and smoking have mainly been suggested. The first is the allocative efficiency that education brings to health, either because education makes people better decision-makers (Grossman (1975)) or because more educated people have better information about health (Kenkel (1991), Rosenzweig and Schultz (1991)). The second explanation suggests that the correlation could be caused by a third unobserved variable that affects both education and health, for example genetic characteristics. As such, the measurement of the impact of education on health would suffer from omitted variable bias.[4]

As Fuchs (1982) pointed out, discount rates would also explain the correlation: people who are impatient invest little in education and health, while people who are patient invest a lot in both. Indeed, in a standard cross-sectional analysis Farrell and Fuchs (1982) find that eventual completed schooling predicts smoking just as well at age 17 as it does at age 24, suggesting that a college education does not explain less smoking among the better educated.

Blending the allocative efficiency and the time preference ideas, Becker and Mulligan (1997) posit that higher education teaches individuals how to be more patient. Though it may be observationally equivalent to Fuchs (1982)'s hypothesis, their model suggests that one should consider that some of the benefits associated with low discount rate behavior should be counted as a return to schooling.

Regardless of its origin, the nature of the link between education and smoking may have some policy implications for education. For instance, if the effect of schooling on health operates through time preference, the current school-based programs to promote health knowledge may have smaller payoffs than programs that encourage future-oriented behavior in the general population (Grossman (2000)).

On the empirical side of the issue, a few studies (Berger and Leigh (1989), Sander (1995), Leigh and Dhir (1997)) have used instrumental variable estimation with measures of health such as smoking or exercise. For instance, Sander finds that schooling has a positive effect on the odds

[4]There are also other possible explanations. For instance, Perri (1984), and Currie and Hyson (1999) suggest that poor health results in little education.

that men and women quit smoking. One potential criticism of these papers involves the choice of instruments. All these studies use parents' background and education as instruments, and these are likely to be correlated with children's health, particularly given that health stocks acquired during childhood or gestation have persistent health effects into adulthood. Other studies looking at health outcomes, and which make use of instrumental variables to control for the endogeneity of educational attainment, include Lleras-Muney (2002) who uses compulsory schooling laws to analyze the effect of schooling on mortality, Adams (2002) and Arendt (2002) who exploit compulsory schooling age differences when individuals were of school age, and Arkes (2001) who uses variation in unemployment rates during periods in which individuals were of school age. In addition, examining the effect of maternal education on health, Currie and Moretti (2003) use data about the availability of colleges in the woman's country in her 17th year as an instrument for education and find that higher education reduces the probability that a new mother will be smoking.

Our approach is to follow a similar strategy by appealing to the arguably exogenous increase in educational attainment for the cohort of men born in the mid to late forties relative to females of the same cohort in establishing the link between education and smoking.

3 Data and Methodology

3.1 Data Description and Analysis

We use the 1995, 1996, 1998, and 1999 Current Population Survey Tobacco Supplements. In addition to the standard items on personal characteristics such as age, gender and education, the supplements contain fairly detailed questions on smoking incidence and intensity at the time of the interview as well as the age at which respondents started smoking "fairly" regularly. [5]

Of all the individuals surveyed by the CPS, veterans deserve special attention because of their health and education characteristics. First, war veterans have traditionally benefited from education subsidies. Second, war veterans are more likely to smoke compared to the rest of the population, as documented in Bedard and Deschênes (2006) for Veterans born between 1920 and 1939. We find

[5]The latter question is asked to both self-respondents and proxy respondents. However, only self-respondent former smokers are asked questions about the age at which they stopped smoking regularly or completely, and about the number of cigarettes smoked. Smokers are defined in the CPS as having smoked at least 100 cigarettes in their life.

that it also holds for Vietnam War veterans. Consequently, although previous work by e.g. Bound and Turner (2001) and Stanley (2003) has found that the various "G.I. Bills" have had an effect on the educational attainment of War Veterans, the independent effect of education on smoking, assuming there is any, would be potentially dwarfed by the direct effect of war participation unless we can control for it. Thus, our analysis will need to take into account the status of those CPS respondents who identified themselves as war veterans.

Our main sample consists of white male and female U.S born citizens aged at least 25 and born between 1935 and 1974.[6] The 1935 cutoff point is largely chosen because of concerns that may be raised regarding how representative a sample of non Veterans old enough to have been potentially eligible to participate in either World War II or the Korean War would be. Given the large fraction of males who participated in these two conflicts, especially World War II, those who were exempted from service are likely to exhibit a relatively greater incidence of various health limitations. It can of course be argued that a large fraction of US males participated in the Vietnam War as well. However, draft avoidance through education-related deferments is a phenomenon that was not as important in the other two conflicts; in fact, it was not possible in the case of World War II (Card and Lemieux (2001)). Another reason to focus on individuals born starting in 1935 is that since the tobacco consumption questions are asked in the mid to late 90's, many people in their sixties and above have already stopped smoking, irrespective of their education level.

Figure 1 and Table 1 serve as our starting point and simply confirm the well-documented cross-sectional relationship between schooling and smoking. Looking at Figure 1, it is quite clear that smoking incidence, however defined, declines sharply starting with high school graduation and continuing through post-secondary schooling.[7] Completion of high school appears to be a specific event in determining smoking. The upward sloping portion of the schooling-smoking gradient should be taken with a grain of salt: there are few observations at very low levels of schooling. Next, Table 1 displays various degrees of incidence of cigarette smoking by educational attainment for (non veteran) white males and females. Male smokers who did not complete high school have a

[6]The lack of information on citizenship/country of birth made the use of the earlier (September 1992, January 1993, and May 1993) Supplements problematic. Given our identification strategy and our desire to control to some extent for "country-specific norms" in terms of smoking, we think our approach applies best in the case of U.S. born citizens.

[7]Note that since the CPS no longer contains a direct question on completed years of schooling, we constructed that measure of educational attainment using Park (1996)'s mapping between the educational attainment categories now reported in the CPS and completed years.

46 percent probability of smoking regularly whereas there is less than an 8 percent probability of finding a smoker among white males with a college degree.[8] However, the table suggests that the distinction across educational attainment does not apply in absolute terms to those who claim to be occasional smokers. Yet, in relative terms, there is some difference across educational attainment: occasional smokers represent over 30 percent of those declaring to be smoking for those with a college degree whereas occasional smokers are only about 10 percent of the smokers with less than a high school degree. The same patterns are present when we look at the difference in the fraction of people reporting themselves to be former smokers across educational attainment categories. This is particularly true in the case of men. Unconditionally, the percentages are fairly similar but conditional on ever having been a smoker, more education increases the likelihood of being a former smoker.[9]

The next two figures illustrate the experiment we want to exploit. Figure 2a shows the fraction of white males and white females with a Bachelor's degree or more across birth cohorts, while Figure 2b depicts the fraction of regular or occasional smokers at the time of the interview. As documented in Card and Lemieux (2001), the enrollment rate of college-age men in the United States between 1965 and 1975 rose and then fell noticeably. For males born between 1945 and 1950, one very short-term benefit of getting into college appeared to be a higher likelihood of avoiding the Vietnam draft, given that the Selective Service issued college deferments to enrolled men that delayed their eligibility for conscription. Using women as the control group, Card and Lemieux provide evidence that the Vietnam-era draft led to a rise in male college attendance rates between 1965 and 1970, and a corresponding rise in college completion rates for males of the first baby-boomer cohort. As can be seen from Figure 2a, the increase in the fraction of males with at least a B.A. degree is quite significant. Turning to Figure 2b, the visual evidence provides support to the notion that relative to women, males born between 1945 and 1950 were less likely to report smoking on a regular basis in the mid to late 90's. However, the relative change in educational attainment between males and females of the 1945-50 cohort is not quite so apparent in Figure 3a where we pool veterans and

[8]The Supplement defines a regular smoker to be someone who reports smoking (or having smoked) every day for at least six months. The others, among those who have smoked at least 100 cigarettes in their life, are defined to be occasional smokers.

[9]Note, though, that we are mixing all the birth cohorts together, which can be misleading given the sharp changes in both educational attainment and smoking across cohorts. The same computations done with the 1945-50 birth cohort only do suggest that, even unconditionally, more educated individuals are more likely to be former smokers, especially in the case of females.

non veterans along with the full sample of females. Also, we can see in Figure 3b that there is less evidence, at least visually, that smoking incidence decreased for males born between 1945 and 1950 relative to women.

3.2 Statistical Framework

We use a birth cohort dummy for males born between 1945 and 1950 as an instrument for education. In effect, we posit that the males of the first baby boom cohort were subject to a particular treatment compared to females and to males of other cohorts: getting a college education as a means of avoiding the draft. The maintained assumption is that the cross-cohort difference in smoking between males and females follows a smooth-enough trend and that any departure between 1945 and 1950 from that evolving difference will be attributed to the extra education brought about by the draft avoidance behavior. Note that, for comparison purposes, we will also present results using males only. In that case, the identification of a treatment effect rests entirely on the assumption that the independent effect of age for males is sufficiently smooth.[10]

The added benefit from using females as our control group, which allows us to avoid using stronger identifying conditions, is that one may be worried about the impact of the release in January of 1964 of the Surgeon General's report on smoking. Looking at Figure 2b it would appear that there is a breaking point in the steady rise in the smoking incidence up to those who were born in 1960. Indeed, both white male and female individuals of the first baby boom cohort (born between 1945 and 1950) appear to buck the upward trend in smoking incidence, the break being perhaps more obvious in the case of females. Note that these individuals were between 15 and 20 years old, a crucial period in terms of starting smoking, when the Surgeon General published his first report on the adverse consequences of tobacco on health. They may have been relatively open to the message, compared to other cohorts. The crucial assumption, then, is that both males and females reacted in a "sufficiently similar" way.

The 1964 report created quite a stir in the media. It was ranked among the top news stories of 1964. It could conceivably have affected this cohort. But, again, what is required in terms of identification is *not* that no one reacted to the release of the report, just that men born between

[10] The case in which we use only males is similar in spirit to the so-called regression discontinuity design. See Hahn et al. (2002) for a formal discussion on the identification of treatment effects in such models.

1945 and 1950 did not process the information too differently compared with women of the same cohort. Still, it would be useful to have direct evidence that our identifying assumption appears to be reasonable. With that in mind, we pulled data from Canada's 1994 and 1999 National Population Health Surveys (NPHS) to reproduce the equivalent of Figure 2b.[11] Figure 4 shows the fraction of males and females smoking regularly by birth cohort.[12] Although there is evidence of a trend break between the 45-49 and the 50-54 birth cohorts, there is little suggesting that males and females adjusted their trends differently.[13] We come back to this issue below when we perform a more formal falsification analysis.

4 Results

Table 2 presents the estimates of the effect of education on smoking for our treatment groups of white males born between 1945 and 1950 using other white males and females as control groups.[14] Panel (A) of the table looks more carefully at the decision to start smoking with a comparison between smokers and those who never smoke whereas Panel (B) focuses more on the decision to quit smoking using a comparison between current and former regular smokers. Finally, Panel C focuses on the decision to quit smoking but only for the subsample of people who started before they were 18 years old.

Each panel shows the development of the estimation procedure. Except where indicated, each line in the following tables represents a separate regression. The panel begins with the estimates of the simple, cross-sectional effect of education on smoking using three different measures of educational attainment: years of schooling, at least some college education, and college completion with a B.A. degree or more. The second set of estimates presented in the panel is the effect of the cohort dummy on our variables of interest. Finally, the bottom part reports the IV estimates of the effect

[11] We selected males and females aged at least 25 who were born starting in 1935. We excluded respondents from Québec for two reasons. The first one is that the 1999 survey did not ask a question about the mother tongue of the respondent, and French-speaking Quebeckers smoke more than other Canadians, whose smoking behavior is similar to that of Americans. The second reason is that Québec implemented a major reform in its educational institutions starting in the mid-60's, which could have impacted the smoking behavior of people belonging to approximately the same birth cohorts as in the U.S.

[12] One disadvantage of the NPHS is the fact that age is bracketed in 5-year intervals.

[13] The presence of a trend break in the Canadian data, like in the U.S. data, does suggest that a similar factor played a role in both countries, the main suspect being the 1964 Surgeon General's report. Interestingly, Canada began regular monitoring of smoking prevalence rates in 1965, that is, soon after the release of the U.S. Surgeon General's report (Health Canada (2001)).

[14] Results (not shown here) obtained using a bivariate probit model were very similar.

of education on smoking, again with the three different measures of education. We also report the coefficient associated with being a Vietnam War Veteran, controlling for years of schooling.

The first two columns of Panel A of Table 2 provides the estimates when the comparison is done using those who ever smoked versus those who report having never smoked in their life. The comparison between those who report being current regular smokers and those who never smoked is shown in columns 3 and 4 of Panel A. For each estimation, we report the results using two different specifications for the trends: one in which each regression contains an overall as well as a male-specific age polynomial (quartic), and the other which includes an unrestricted set of age dummies in addition to a male-specific quartic in age.[15]

The first thing to note is that education is negatively related to becoming a smoker. Not surprisingly, whether one uses years of schooling, a dummy for college attendance or one for college completion, the estimates shown on lines 1-3 of Panel A in the four column are all negative and highly statistically significant. Furthermore, the gradient is stronger when using those who currently smoke only. If we look at the reduced form linking smoking and the birth cohort dummy, we can see that the difference in the incidence of smoking between males and females born between 1945 and 1950 decreases, controlling for all other observables. Second, the estimates in lines 5-7 show that white males of the first baby boom cohort were more likely to have received additional years of education, to have attended college and to have completed college. These results indicate that our excluded instrument does seem to be a good predictor of educational attainment. Although not shown in Table 2, the F-statistic for the excluded instrument in the case where we use years of education is over 40. Of course, the validity of our results rests on the assumption that the process which led those males to get more schooling was not also independently making them smoke less. This is one of the main concerns which one could legitimately have regarding our identification strategy.[16]

[15]Each regression also contains dummies for gender, whether there is another regular smoker in the household, living in a metropolitan area, marital status, region of residence (4 categories), family income (14 income brackets), and labor force status (6 categories). We also control for being a non-Vietnam veteran.

[16]We have also used the "induction risk" measure constructed by Card and Lemieux which represents the average number of inductions over the years each cohort was 19 to 22 years of age divided by an estimate of the size of the cohort. Whether we use that measure as an instrument for education for the 1935-1959 cohorts (the ones studied by Card and Lemieux) or the 1935-1974 cohorts we use in our base specifications, the qualitative conclusions are the same as when we use the birth cohort dummy. The main difference is in the precision of the estimates, which is greater when we instrument with the birth cohort dummy. Note also that the induction risk measure is a strong predictor of schooling even when we add as a control variable a dummy for being born between 1942 and 1950 (in addition to our smooth trend). Such a dummy would control for other unmeasured cohort-specific factors behind the

The full instrumental variable estimation results shown in lines 8-10 of the first column show that, however measured, more education leads to a significant reduction in smoking. In fact, it would appear that there is no reason to believe that the cross-sectional relationship estimates shown at the top of Panel A overstate the impact of education. Thus, education appears to have a causal effect on whether one starts smoking when comparing those who ever smoked to the people who have never smoked or on being a regular smoker at the time of the interview when we compare current regular smokers with those who who never took on the habit. We return in Section 4.1 to the issue of the size of the coefficients.

We now turn to Panels B and C of Table 2 and the question of whether more education makes people more likely to report that they are former smokers. The probit results in lines 1-3 show the usual strong negative relationship between education and smoking. However, as we can see from the reduced form probit, there is little indication that the instrument is related to the outcome of interest. Given the lack of evidence of a reduced form relationship, it is not surprising that the IV estimates are suggestive of a fairly limited role for education in the process leading one to stop smoking. Naturally, the fact that the estimates are imprecise precludes us from reaching a stronger conclusion as to whether more education makes people stop smoking.

If we limit the sample to the individuals who started smoking before they were 18 years of age, the IV estimates are again imprecise but are actually of opposite signs due to the sign reversal in the reduced form. A cautious conclusion as to whether more educated people are more likely to stop smoking regularly because of education would be that it is still possible that such a link exists but our instrument simply does not create enough variation to pick it up. Indeed, as can be seen from the first-stage estimates, the instrument is in fact considerably weaker than it is in Panel A when we measure educational attainment as either years of completed schooling or having at least a B.A. degree (but not much weaker when education is measured as having at least some college). Consequently, it is possible that the absence of any reduced form relationship between smoking and the cohort dummy results form the fact the instrument does not generate a sufficient (and precise-enough) increase in educational attainment.

As it turns out, the results in Panel C are consistent with those in Farrell and Fuchs (1982). In their paper they show that college education does not appear to have made people change their

marked increase in educational attainment over that time period.

smoking behavior relative to when they were 17 years-old: whether someone who was smoking at 17 quit smoking or not afterwards had little to do with getting more education. Our conclusion is similar. Where our results differ from those in Farrell and Fuchs, though, is that we are able to say something about those who never started smoking by exploiting the marked increase in college attendance for the cohort of males born in the late to mid forties whose college attendance decision was driven by an exogenous event.

However, it is still possible that selectivity is driving all of our results. When we include veterans in our analysis we make the assumption that it sufficient to control for veteran status. It might be preferable to make the Vietnam War participation dummy endogenous as well, or at least to check the validity of using it as a control variable through the imposition of overidentifying restrictions. We return to this issue in Section 4.2.

Finally, in case one is still suspicious about comparing the smoking behavior of males and females, in Table 3 we report the results obtained from performing the same analysis using male non-veterans only. Again, except for the smaller sample sizes, the same overall conclusions emerge: education does seem to markedly reduce the probability of becoming a smoker while it plays at best a modest role in inducing regular smokers to quit. In the latter case, all the estimates shown in Panels B and C of Tables 2 and 3 would seem to indicate that some important factor other than education makes people quit smoking regularly and that this other factor happens to be correlated with educational attainment.

4.1 Magnitude of the Coefficients

Roughly 75% of those who ever smoked start before they reach the age at which they attend college (see figure 5). Consequently, the population of potential smokers who are deterred from starting smoking by getting a college education is not very large. The question then becomes why we get such large IV estimates and whether they are credible. We believe our results are best viewed as representing local average treatment effects (Imbens and Angrist (1994)). That is, they represent the impact of getting a college education on the probability of taking up smoking for a particular group: this is a group of men who had not started smoking upon completion of high school and who, presumably, decided to attend college in order to avoid being drafted. Our results suggest that the impact of education for that sub-population was substantial in reducing the probability

they start smoking. To reiterate, we do not view our results as representing the average treatment effect in the overall population. Clearly this would not make sense as the majority of all smokers have already started prior to going to college.

4.2 Endogenizing Veteran Status

Although we control for veteran status, it could be argued that it is not enough. The fact that becoming a veteran is endogenous could contaminate our IV results through the correlation of the endogenous veteran dummy with the predicted education in the second stage. In this section we check whether our results are robust to treating veteran status as an additional endogenous regressor.[17]

To endogenize veteran status, we exploit some additional health related information contained in the pooled 1997-2002 National Health Interview Surveys (NHIS) to estimate similar IV models in which we can endogenize veteran status.[18] To do so we first make use of a question about whether an individual has been honorably discharged from the Armed Forces. Comparing the frequency of this variable in the NHIS data sets to the veteran status variable in the 2000 US census reveals that the honorable discharge variable somewhat underestimates the status of veteran for older cohorts but is very similar for the other cohorts. Thus, we use the honorable discharge variable as a proxy for veteran status.[19] Secondly, as an instrument for having been honorably discharged, we use two questions: one asking whether the individual suffers from an incapacitating health problem, and the other asking the number of years the individual has had that problem. Combined with the age variable, we then construct as our instrument for veteran status a dummy for whether an individual has been incapacitated since he/she was less than 18 years-old.

In Table 4, Panels A and B, we report the results from estimating IV models first by simply instrumenting the educational attainment variable with our two instruments, the birth cohort dummy

[17] Although not shown here, we also checked whether our results vary with the choice of birth cohort dummy. To do so we estimated the same IV models as in Table 2A, column 3 and Table 2B, column 1 with different choices of birth cohort intervals. Whether we expand the time interval to either 1945-1952 or 1942-1954 so as to broaden the number of birth cohorts that went to Vietnam or reduce it to 3 birth cohorts (1946-48) so as to better encompass the "peak years" in draft avoidance behavior, the results are very similar to what is shown in Table 2. Those results are available upon request.

[18] As in the case of the CPS, the sample is composed of U.S. born white males and females born between 1935 and 1974.

[19] Prior to 1997, the NHIS questionnaire had an explicit question on veteran status. Unfortunately, that question was dropped in the 1997 questionnaire remodeling.

as well as the health limitation dummy. Then we instrument both education and the veteran status proxy. For comparison purposes with our results using the CPS, we also report as a starting point the cross-sectional probit estimates of the effect of having at least some college on the probability of being a current regular smoker (Column 1). As we can see, the coefficient is roughly similar to what we saw earlier although it is somewhat larger in absolute value.

If we simply use the additional instrument to overidentify the educational attainment endogenous regressor, we can see in Column 2 of either Panel B or Panel C of Table 4 that the explanatory power of the instruments is quite good, as shown by the F-statistic. In addition, the two-stage least-squares estimates in Column 5 of both panels provide no indication that the cross-sectional estimates are biased due to unobserved heterogeneity. Moreover, the model easily passes the overidentification test, providing further evidence in favor of our base case results using the CPS.

Columns 3 and 4 show the first stage regressions when we instrument the honorably discharged and the educational attainment dummies. Again, the instruments are powerful and, as can be seen in Column 6, the two-stage least squares education coefficient is little affected compared to its value in Column 5. Overall, there is no evidence in Table 4 suggesting that our earlier results are driven by some unobserved factor which happens to be correlated with schooling.

4.3 Falsification

As pointed out earlier, using men imposes the stronger requirement that smoking follows a smoothly evolving time trend, which allows the more or less sudden departure from the trend estimated for the 45-50 birth cohort to be attributed to the equally sharp departure in educational attainment. Both Figure 3a and Figure 4 with Canadian data would suggest that a trend break occurred starting with the mid-forties cohorts. Consequently, this threatens the identification strategy when using males only.

To check whether the results reported above can be replicated in an environment in which one would not expect them to be present, that is where there was no sudden increase in education, we used the pooled 1994 and 1999 Canadian National Population Health Surveys to perform the same regressions as those reported in Tables 2 and 3. [20]

[20] As pointed out earlier, one drawback from using those data sets is that age is reported only in five year brackets. Hence, to construct our age polynomials we used the mid-range age in each birth cohort.

Much like in the case of the US data, the results reported in Table 5 first show a strong negative cross-sectional relationship between smoking and educational attainment. Next, we can see that there is very little evidence that the difference in smoking incidence between males and females decreased for the 45-50 cohort relative to the other cohorts. Additionally, there is simply no evidence of a first-stage relationship between the education and the cohort variables. Not surprisingly, then, the IV strategy breaks down and the estimates in columns 1 and 2 reflect both the lack of identification due to the weak instrument as well as the virtual absence of a reduced form relationship to explain. In summary there is very little in Table 5 which suggests that the male-female difference in smoking for the 45-50 birth cohort occurred due to some other factor that may have coincided with the release of the Surgeon's General report (or any other event) that would likely have had an impact in Canada as well.[21]

5 What Is the Mechanism Linking Education and Smoking?

Although our results support the notion that the negative correlation between educational attainment and smoking does not, at least in the case of the decision to start smoking, arise simply because of some unobserved joint determinant of education and smoking, it still leaves unanswered the question of how exactly education influences smoking behavior. A first candidate explanation could be that more educated people are better able to process the information related to the health hazards associated with smoking. Viscusi (1990), however, provides strong evidence that both non-smokers and smokers alike considerably *overestimate* the risk of lung cancer. He also shows that the probability of smoking is inversely related to the perceived risk. Consequently, if more education makes people adjust their subjective probabilities so they are closer to the true risk, this should increase the likelihood of picking up smoking, not decrease it, as the theoretical work of Carbone, Kverndokk and Røgeberg (2006) shows.

A second possibility would be along the lines suggested in Becker and Mulligan (1997). Given that more educated people are paid more, receiving an additional dose of education may lower the discount rate thus providing an economic incentive to make health related investments. Although

[21] The report was front page news in the Toronto Daily Star (now the Toronto Star) (Toronto Daily Star (1964)), Canada's newspaper with the widest circulation, the same day it was released. There were many other report-related feature reports in subsequent days.

this is an attractive possibility, there is little in our data which would allow us to provide supporting evidence for it. A potentially fruitful area of research that would go some way toward verifying the implications of the Becker-Mulligan model would be to see whether individuals treated to more education are also more likely to choose other future-oriented options.

The third mechanism has little to do with education per se and more to do with the group one associates with. If peers influence behavior, then it might be that going to college allows people to interact with groups of individuals who are less likely to smoke compared to the individuals one would have encountered on the labor market, and this would in turn dissuade them from picking up the habit. Peer group influence on individual behavior has been the subject of increased scrutiny over the last few years. For example, Gaviria and Raphael (2001) find that over a range of outcomes including smoking, peer group behavior does tend to play a very important role.[22]

To check whether we can see some manifestation of peer group influence, we first show in Figure 5 two separate cumulative distributions of the starting age of all the "ever smokers" who started before they were 26, one for those born between 1945 and 1950, and another one for all the others. The idea is to see whether those who we argue received an unexpected dose of education (due to draft avoidance behavior) exhibit differences in terms of the age at which they started. From Figure 5, we can see that those born in 1945-50 tend to have delayed their decision to start smoking at around the age one enters college. This is true whether we look at all the cohorts in Panel A (1935-1974) or the more narrowly defined 1940-1955 cohorts (Panel B).[23] Although we can, of course, only draw these distributions for people who ever became smokers, the results in our previous tables provide strong evidence that many individuals never became smokers as a result of having attended college. One can then view those individuals as having indefinitely delayed their decision to start smoking because college might have given them a relatively less tobacco-intensive environment than working, say, in a blue collar industry. In that case, education would have had a causal effect on taking up smoking mostly because it associated individuals with a higher proportion of non-smoking

[22] See also Powell et al. (2003). As is now well known, identifying peer effects is not straightforward (Manski (1993)). Gaviria and Raphael use as an instrument for peers' behavior the family background of the peer group members. They explicitly assume that the average family background characteristics of other group members do not have a direct influence on any member who does not belong to the same family.

[23] Note also that these visual differences in the raw data are also present in a more formal analysis when we control for other covariates in probit models where the dependent variable is dummy indicator for starting to smoke before 20. The coefficient on the 1945-1950 cohort dummy is negative and statistically significant. Results are available upon request.

individuals.

Secondly, we pursue a related idea by looking at the distribution of the calendar year in which people started smoking by educational attainment for the two subgroups in the 1945-1950 cohort consisting of male veterans and male non-veterans.[24] It should first be noted that the distributions shown in the top part of Figure 6 are to a first approximation what we observe for all the other cohorts as well (when plotted against starting age): high school dropouts start first, followed by high school graduates and then college educated workers. However, the picture for Veterans does not exhibit such a clear monotonicity of the average starting age with respect to educational attainment. In fact, the distribution for college graduates is not all that distinguishable from that of high school graduates. Obviously, all those men have one characteristic in common: they all served during the Vietnam years and they more or less started smoking around the same years. While it would be difficult to reconcile the discrepancy between the two panels of Figure 6 by invoking information processing capabilities, it is not as difficult to rationalize it by appealing to peer effects playing a role.[25]

Obviously, more research and better data are needed before one can understand and assess further the relative strengths of the mechanisms linking education and smoking. However, Figures 5 and 6 suggest that, besides the information-processing and time-preference modification propositions, one might also consider the influence, whether positive (Figure 5) or negative (Figure 6) that peer effects may have on smoking.

6 Conclusion

In this paper we exploit the unusual departure from pre and post-existing trends in the educational attainment of males born between 1945 and 1950 relative to females and use this source of variation to explain the concomitant reduction in the males' propensity to smoke. Our results support the hypothesis that education allows an individual to select a healthier lifestyle in at least one respect:

[24] Obviously, the distributions could have been drawn with respect to starting age, instead of calendar year, and the visual impression would have been roughly the same.

[25] It is true that the U.S. Armed Forces provided free cigarettes to their troops (Bedard and Deschênes (2006)), and thus different price effects by educational attainment could drive the visual differences in Figure 6. Perhaps more importantly, unobserved heterogeneity could also play a role as some veterans received a college education after being discharged due to the presence of the G.I. Bill. They may have otherwise settled for a high school degree in the absence of the Bill and thus would have been more similar to high school graduates compared to other cohorts of college graduates.

a higher educational attainment reduces the probability of taking up smoking. However, the effect of higher educational attainment on smoking is not symmetrical. Consistent with the results in Farrell and Fuchs (1982), we find little evidence that education makes people quit smoking. This last result, though, is not very precisely estimated and it might be that a more powerful instrument would identify an effect. Still, the virtual absence of any relative decrease in the fraction of males born between 1945 and 1950 who smoke regularly (conditional on ever becoming a smoker) suggests to us that, at the very least, the main impact of education on smoking incidence operates through its dissuasive effect on non-smokers. This result is perhaps not surprising given the particular nature of tobacco. Nicotine addiction makes it very hard to quit smoking, as many people who quit smoking eventually relapse and may require repeated attempts before they can definitely achieve long-term abstinence.[26] If one views tobacco dependence as a chronic disease with remission and relapse, it is not clear that a higher educational attainment will aid an individual in weaning herself off tobacco than other factors such as counseling or pharmacological treatments could.

[26]See U.S. Department of Health and Human Services (2000), chapter 4, for a review of the various interventions to promote smoking cessation.

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Table 1. Incidence of Cigarette Smoking by Educational Attainment.

	Never	Every Day	Some Days	Former Smoker
White Males (N=82,079)				
Less Than H.S. Degree	0.272	0.460	0.049	0.219
High School Degree	0.419	0.314	0.045	0.222
Some College	0.507	0.216	0.046	0.232
B.A.+	0.686	0.077	0.035	0.202
White Females (N=115,597)				
Less Than H.S. Degree	0.383	0.409	0.042	0.165
High School Degree	0.483	0.273	0.041	0.202
Some College	0.538	0.198	0.043	0.220
B.A.+	0.689	0.074	0.032	0.204

Notes. Source: Sept. '95, '98, Jan. '96, '99, May '96, '99 CPS Tobacco Supplements. Only Non Veterans are included.

Table 2. Educational Attainment and Smoking: Males vs Females.

Panel A: Impact of Education on Starting Smoking.

		(1)	(2)	(3)	(4)
		Ever Smoked vs. Never Smoked		Smoking Regularly vs. Never Smoked	
	Dep. Variable:	Smoking Every Day or Some Days at Interview or Being a Former Smoker=1		Smoking Every Day at Interview=1	
		(A)	(B)	(A)	(B)
	Smoking-Education Probits				
1.	Yrs. of Schooling	-0.0357	-0.0357	-0.0448	-0.0448
		(0.0049)	(0.0026)	(0.0046)	(0.0023)
2.	Some or Completed College	-0.1327	-0.1322	-0.1753	-0.1753
		(0.0162)	(0.0089)	(0.0134)	(0.0090)
3.	B.A. Degree or More	-0.1903	-0.1900	-0.2252	-0.2250
		(0.0163)	(0.0098)	(0.0113)	(0.0069)
	Vietnam War Participation	0.1282	0.1297	0.1495	0.1517
	And Smoking Status*	(0.0132)	(0.0069)	(0.0166)	(0.0090)
4.	**Reduced Form Smoking (Probit)**	-0.0248	-0.0172	-0.0295	-0.0223
		(0.0021)	(0.0052)	(0.0034)	(0.0062)
	First-Stage for Education				
5.	Yrs. of Schooling (Linear reg.)	0.1860	0.1219	0.2217	0.1695
		(0.0649)	(0.0322)	(0.0694)	(0.0364)
6.	Some or Compl. Coll. (Probit)	0.0435	0.0311	0.0507	0.0378
		(0.0150)	(0.0103)	(0.0162)	(0.0114)
7.	B.A.+ (Probit)	0.0453	0.0294	0.0540	0.0394
		(0.0112)	(0.0068)	(0.0109)	(0.0067)
	Instrumental Variable Estimates				
8.	Yrs. of Schooling	-0.1159	-0.1188	-0.1299	-0.1344
		(0.0384)	(0.0566)	(0.0316)	(0.0488)
9.	Some or Compl. Coll.	-0.5891	-0.5571	-0.6760	-0.7217
		(0.1967)	(0.3244)	(0.2083)	(0.3393)
10.	B.A.+	-0.5155	-0.5087	-0.5870	-0.6021
		(0.1198)	(0.2031)	(0.0797)	(0.1677)
	N	227,027	227,027	165,925	165,925

Notes. Robust (clustered at the birth cohort level) standard errors in parentheses. The instrument consists of a dummy variable for being a male born between 1945 and 1950. Covariates include dummies for gender, marital status, region of residence, living in a metropolitan area, presence of another smoker in the household, labor force status (dummy for each category), survey, and family income. Specification (A) includes an overall as well as a male-specific quartic in age, while specification (B) includes unrestricted age dummies as well as a male-specific quartic in age. *Estimate is obtained controlling for years of education in addition to the other regressors.

(Table 2, continued)

Panel B: Impact of Education on Quitting Smoking

		(1)	(2)	(3)	(4)
		Current vs. Former Regular Smokers		Current Regular vs. Former Regular Smokers	
	Dep. Variable:	Smoking Every Day or Some Days at Interview=1		Smoking Every Day at Interview==1	
		(A)	(B)	(A)	(B)
	Smoking-Education Probits				
1.	Yrs. of Schooling	-0.0336	-0.0336	-0.0380	-0.0380
		(0.0020)	(0.0019)	(0.0022)	(0.0022)
2.	Some or Completed College	-0.1198	-0.1199	-0.1334	-0.1334
		(0.0058)	(0.0058)	(0.0062)	(0.0061)
3.	B.A. Degree or More	-0.1556	-0.1566	-0.1776	-0.1778
		(0.0069)	(0.0068)	(0.0076)	(0.0076)
	Vietnam War Participation	0.0424	0.0423	0.0485	0.0486
	And Smoking Status*	(0.0063)	(0.0065)	(0.0075)	(0.0079)
4.	**Reduced Form Smoking (Probit)**	-0.0001	0.0024	-0.0025	-0.0000
		(0.0054)	(0.0084)	(0.0056)	(0.0090)
	First-Stage for Education				
5.	Yrs. of Schooling (Linear reg.)	0.1293	0.0586	0.1192	0.0529
		(0.0426)	(0.0382)	(0.0433)	(0.0374)
6.	Some or Compl. Coll. (Probit)	0.0380	0.0308	0.0387	0.0330
		(0.0109)	(0.0114)	(0.0111)	(0.0115)
7.	B.A.+ (Probit)	0.0285	0.0131	0.0268	0.0110
		(0.0060)	(0.0059)	(0.0064)	(0.0058)
	Instrumental Variable Estimates				
8.	Yrs. of Schooling	-0.0031	0.0336	-0.0196	-0.0011
		(0.0369)	(0.1358)	(0.0424)	(0.1501)
9.	Some or Compl. Coll.	-0.0124	0.0731	-0.0696	-0.0016
		(0.1466)	(0.2839)	(0.1528)	(0.2751)
10.	B.A.+	-0.0124	0.1303	-0.0752	-0.0046
		(0.1453)	(0.5374)	(0.1538)	(0.6257)
	N	83,063	83,063	78,474	78,474

Notes. Robust (clustered at the birth cohort level) standard errors in parentheses. The instrument consists of a dummy variable for being a male born between 1945 and 1950. Covariates include dummies for gender, marital status, region of residence, living in a metropolitan area, presence of another smoker in the household, labor force status (dummy for each category), survey, and family income. Specification (A) includes an overall as well as a male-specific quartic in age, while specification (B) includes unrestricted age dummies as well as a male-specific quartic in age. *Estimate is obtained controlling for years of education in addition to the other regressors.

(Table 2, continued)

Panel C: Impact of Education on Quitting Smoking For Those Who Started Smoking Before 18.

		(1)	(2)	(3)	(4)
		Current vs. Former Regular Smokers		Current Regular vs. Former Regular Smokers	
	Dep. Variable:	Smoking Every Day or Some Days at Interview=1		Smoking Every Day at Interview==1	
		(A)	(B)	(A)	(B)
	Smoking-Education Probits				
1.	Yrs. of Schooling	-0.0361	-0.0395	-0.0398	-0.0398
		(0.0024)	(0.0024)	(0.0027)	(0.0027)
2.	Some or Completed College	-0.1315	-0.1317	-0.1437	-0.1439
		(0.0072)	(0.0071)	(0.0076)	(0.0075)
3.	B.A. Degree or More	-0.1748	-0.1750	-0.1943	-0.1946
		(0.0087)	(0.0085)	(0.0091)	(0.0090)
	Vietnam War Participation	0.0621	0.0619	0.0698	0.0694
	And Smoking Status*	(0.0114)	(0.0024)	(0.0117)	(0.0125)
4.	**Reduced Form Smoking (Probit)**	0.0040	0.0064	0.0041	0.0057
		(0.0080)	(0.0092)	(0.0086)	(0.0107)
	First-Stage for Education				
5.	Yrs. of Schooling (Linear reg.)	0.0751	0.0263	0.0607	0.0098
		(0.0417)	(0.0485)	(0.0413)	(0.0465)
6.	Some or Compl. Coll. (Probit)	0.0326	0.0402	0.0318	0.0374
		(0.0104)	(0.0108)	(0.0104)	(0.0108)
7.	B.A.+ (Probit)	0.0209	0.0099	0.0187	0.0063
		(0.0055)	(0.0071)	(0.0054)	(0.0064)
	Instrumental Variable Estimates				
8.	Yrs. of Schooling	0.0464	0.2072	0.0615	0.4909
		(0.0849)	(0.4291)	(0.1079)	(2.3132)
9.	Some or Compl. Coll.	0.1186	0.1497	0.1296	0.1415
		(0.2243)	(0.2237)	(0.2394)	(0.2736)
10.	B.A.+	0.1391	0.4528	0.1622	0.5946
		(0.2767)	(0.7655)	(0.3163)	(1.3323)
	N	45,534	45,534	43,514	43,514

Notes. Robust (clustered at the birth cohort level) standard errors in parentheses. The instrument consists of a dummy variable for being a male born between 1945 and 1950. Covariates include dummies for gender, marital status, region of residence, living in a metropolitan area, presence of another smoker in the household, labor force status (dummy for each category), survey, and family income. Specification (A) includes an overall as well as a male-specific quartic in age, while specification (B) includes unrestricted age dummies as well as a male-specific quartic in age. *Estimate is obtained controlling for years of education in addition to the other regressors.

Table 3. Educational Attainment and Smoking: Males Only.

Panel A: Impact of Education on Starting Smoking.

		(1) Ever Smoked vs. Never Smoked	(2) Smoking Regularly vs. Never Smoked
	Dep. Variable:	Smoking Every Day or Some Days at Interview or Being a Former Smoker=1	Smoking Every Day at Interview=1
	Smoking-Education Probits		
1.	Yrs. of Schooling	-0.0409	-0.0519
		(0.0022)	(0.0024)
2.	Some or Completed College	-0.1580	-0.2066
		(0.0070)	(0.0080)
3.	B.A. Degree or More	-0.2161	-0.2582
		(0.0074)	(0.0077)
	Vietnam War Participation And Smoking Status*	0.1308	0.1569
		(0.0076)	(0.0103)
4.	**Reduced Form Smoking (Probit)**	-0.0247	-0.0317
		(0.0043)	(0.0052)
	First-Stage for Education		
5.	Yrs. of Schooling (Linear reg.)	0.1864	0.2210
		(0.0426)	(0.0451)
6.	Some or Compl. Coll. (Probit)	0.0446	0.0515
		(0.0104)	(0.0117)
7.	B.A.+ (Probit)	0.0480	0.0572
		(0.0080)	(0.0080)
	Instrumental Variable Estimates		
8.	Yrs. of Schooling	-0.1152	-0.1297
		(0.0332)	(0.0341)
9.	Some or Compl. Coll.	-0.5785	-0.6711
		(0.1629)	(0.1981)
10.	B.A.+	-0.5051	-0.5808
		(0.1251)	(0.1239)
	N	109,771	77,477

Notes. Robust (clustered at the birth cohort level) standard errors in parentheses. The instrument consists of a dummy variable for being born between 1945 and 1950. Covariates include dummies for gender, marital status, region of residence, living in a metropolitan area, presence of another smoker in the household, labor force status (dummy for each category), survey, family income, and a quartic in age.

(Table 3, continued)

Panel B: Impact of Education on Quitting Smoking

		(1)	(2)	(3)	(4)
		Current vs. Former Regular Smokers		Current Regular vs. Former Regular Smokers	
	Dep. Variable:	Smoking Every Day or Some Days at Interview=1		Smoking Every Day at Interview==1	
		Full Sample	Sample Restricted to Those Who Started Smoking Before 18.	Full Sample	Sample Restricted to Those Who Started Smoking Before 18.
	Smoking-Education Probits				
1.	Yrs. of Schooling	-0.0292	-0.0313	-0.0334	-0.0349
		(0.0026)	(0.0031)	(0.0027)	(0.0032)
2.	Some or Completed College	-0.1053	-0.1176	-0.1168	-0.1286
		(0.0090)	(0.0107)	(0.0094)	(0.0112)
3.	B.A. Degree or More	-0.1351	-0.1510	-0.1560	-0.1705
		(0.0123)	(0.0132)	(0.0125)	(0.0127)
	Vietnam War Participation	0.0446	0.0592	0.0507	0.0672
	And Smoking Status*	(0.0067)	(0.0120)	(0.0077)	(0.0122)
4.	**Reduced Form Smoking (Probit)**	-0.0010	0.0031	-0.0034	0.0032
		(0.0056)	(0.0080)	(0.0058)	(0.0086)
	First-Stage for Education				
5.	Yrs. of Schooling (Linear reg.)	0.1279	0.0711	0.1175	0.0565
		(0.0430)	(0.0418)	(0.0435)	(0.0413)
6.	Some or Compl. Coll. (Probit)	0.0384	0.0319	0.0391	0.0308
		(0.0110)	(0.0103)	(0.0111)	(0.0103)
7.	B.A.+ (Probit)	0.0300	0.0218	0.0282	0.0197
		(0.0061)	(0.0055)	(0.0064)	(0.0054)
	Instrumental Variable Estimates				
8.	Yrs. of Schooling	-0.0116	0.0361	-0.0284	0.0496
		(0.0388)	(0.0893)	(0.0459)	(0.1160)
9.	Some or Compl. Coll.	-0.0454	0.0912	-0.0998	0.1017
		(0.1541)	(0.2347)	(0.1623)	(0.2533)
10.	B.A.+	-0.0450	0.1041	-0.1071	0.1234
		(0.1472)	(0.2779)	(0.1586)	(0.3205)
	N	39,997	23,312	37,965	22,361

Notes. Robust (clustered at the birth cohort level) standard errors in parentheses. The instrument consists of a dummy variable for being born between 1945 and 1950. Covariates include dummies for gender, marital status, region of residence, living in a metropolitan area, presence of another smoker in the household, labor force status (dummy for each category), survey, family income, and a quartic in age.

Table 4. Educational Attinament and Smoking: Specification Checks

Panel A: Endogenizing Veteran Status (Regular Smokers at Time of Interview vs. Never Smoked)-Males and Females.

	[1]	[2]	[3]	[4]	[5]	[6]
	Simple Probit	**First-Stage**			**IV results**	
		Some or Compl. College (Discharge Exog.)	Some or Compl. College (Discharged Endog.)	Honorably Discharged	Educ. Endog. (Discharge Exog.)	Both Endogenous
Some or Completed College	-0.2062 (0.0080)	-	-	-	-0.4766 (0.0641)	-0.4755 (0.0812)
Honorably Discharged	0.1293 (0.0111)	0.0189 (0.0066)	-	-	0.1317 (0.0113)	0.1289 (0.1210)
Limitation in Activities before 18		-0.1771 (0.0129)	-0.1781 (0.0129)	-0.0525 (0.0075)	-	-
1945-1950 Cohort Dummy		0.0201 (0.0065)	0.0209 (0.0065)	0.0438 (0.0038)	-	-
First-Stage F (Education)		98.76	100.34			
First-Stage F (Honorably Disc.)		-		91.01		
Overidentification Test Statistic [p-value]		-			0.01 [0.98]	Exactly Identified
N=68,376						

Notes. Sample is composed of U.S. born white males and females from the National Health Interview Surveys spanning the years 1997-2002.
Other regressors include an overall as a gender-specific quartic in age, and dummies for gender, survey years, and region of residence.
Standard errors are adjusted for clustering at the birth cohort level.

(Table 4. continued)

Panel B: Endogenizing Veteran Status (Regular Smokers at Time of Interview vs. Never Smoked)-Males Only.

	[1]	[2]	[3]	[4]	[5]	[6]
	Simple Probit	**First-Stage**			**IV results**	
		Some or Compl. College (Discharge Exog.)	Some or Compl. College (Discharged Endog.)	Honorably Discharged	Educ. Endog. (Discharge Exog.)	Both Endogenous
Some or Completed College	-0.2359 (0.0068)	-	-	-	-0.3856 (0.0833)	-0.3564 (0.1271)
Honorably Discharged	0.1421 (0.0128)	0.0165 (0.0073)	-	-	0.1382 (0.0125)	0.0984 (0.0939)
Limitation in Activities before 18		-0.2068 (0.0196)	-0.2082 (0.0196)	-0.1020 (0.0142)	-	-
1945-1950 Cohort Dummy		0.0423 (0.0102)	0.0436 (0.0101)	0.0981 (0.0094)	-	-
First-Stage F (Education)		64.06	65.59			
First-Stage F (Honorably Disc.)		-		98.12		
Overidentification Test Statistic [p-value]		-			0.17 [0.68]	Exactly Identified
N=30,424						

Notes. Sample is composed of U.S. born white males from the National Health Interview Surveys spanning the years 1997-2002. Other regressors include a quartic in age and dummies for survey years and region of residence. Standard errors are adjusted for clustering at the birth cohort level.

Table 5. Falsification Regressions Using Canadian Data.: Males and Females
(Pooled 1994 and 1999 National Population Health Surveys)

		(1) Ever Smoked vs. Never Smoked	(2) Smoking Reg. vs. Never Smoked
	Dep. Variable:	Smoking Every Day or Some Days at Interview or Being a Former Smoker=1	Smoking Every Day at Interview=1
	Smoking-Education Probit		
1.	Completed Post-Secondary	-0.1624	-0.2709
		(0.0139)	(0.0171)
2.	**Reduced Form Smoking (Probit)**	-0.0088	0.0078
		(0.0306)	(0.0426)
	First-Stage for Education		
3.	Some or Compl. Coll. (Probit)	-0.0153	-0.0177
		(0.0279)	(0.0376)
	Instrumental Variable Estimates		
4.	Some or Compl. Coll.	0.2517	-0.3362
		(1.4423)	(1.8802)
	First Stage F-Statistic	1.17	0.64
	N	13,320	8,435

Note. Robust standard errors in parentheses. The instrument consists of a dummy variable for being a male born between 1945 and 1949. Covariates include an overall as well as a male-specific quartic in age polynomial, and dummies for gender, marital status, province of residence, living in a rural area, survey, and family income. Sample excludes the Province of Quebec.

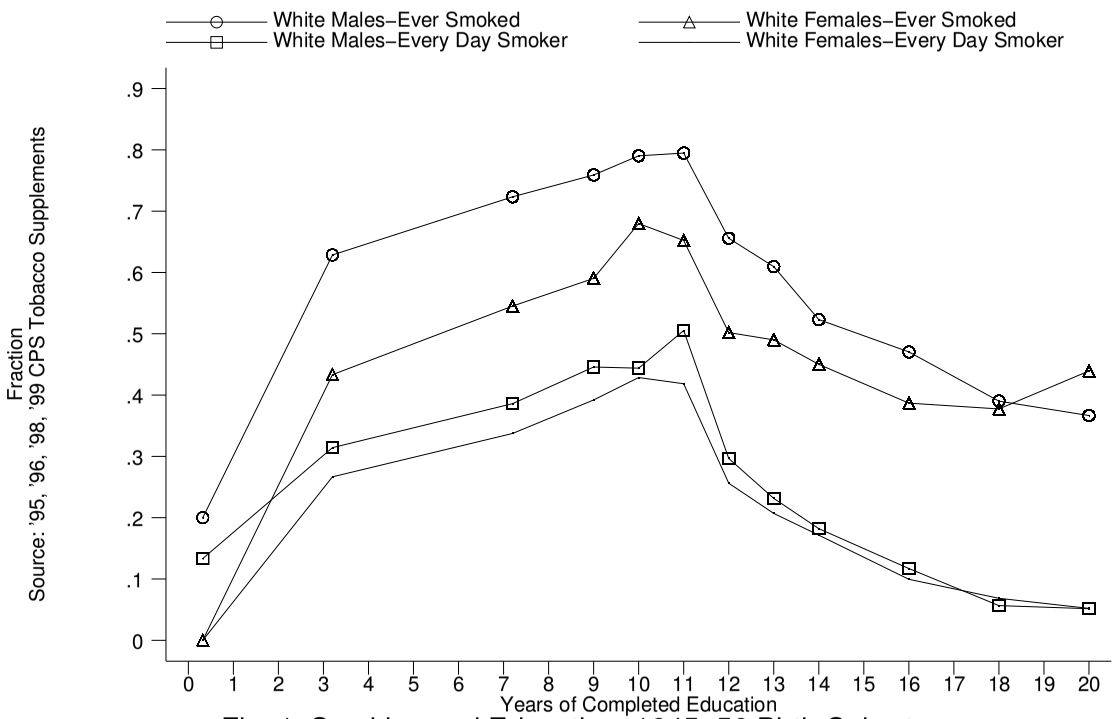


Fig. 1. Smoking and Education: 1945–50 Birth Cohort

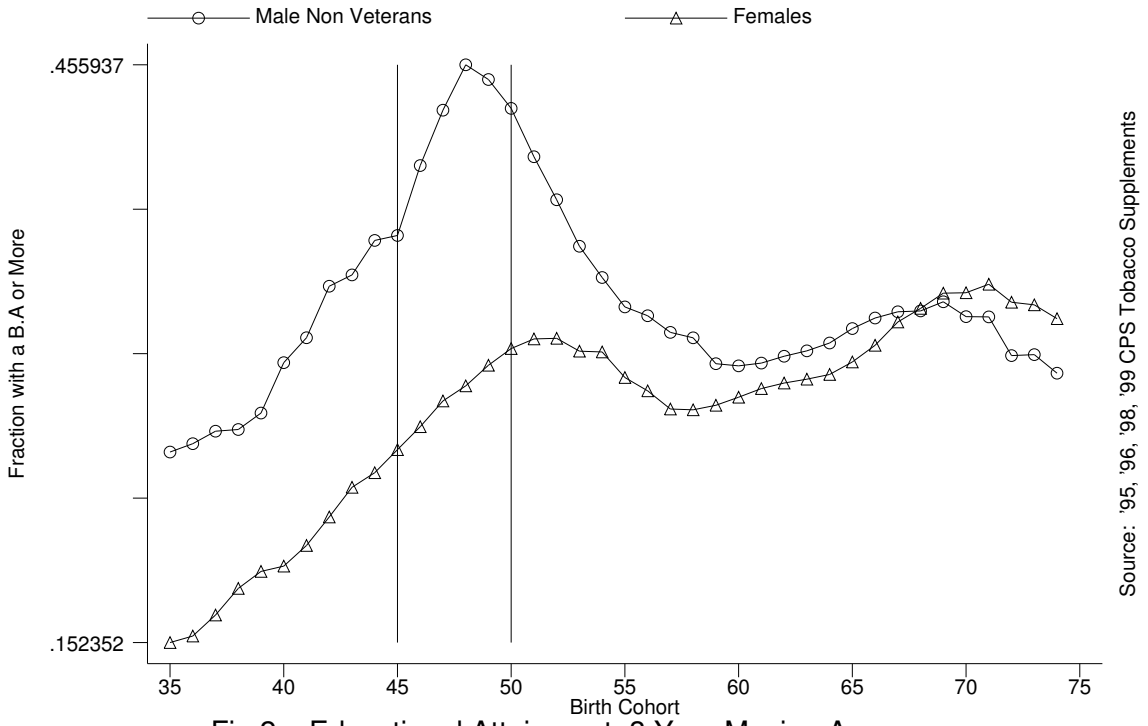


Fig 2a. Educational Attainment–3 Year Moving Average

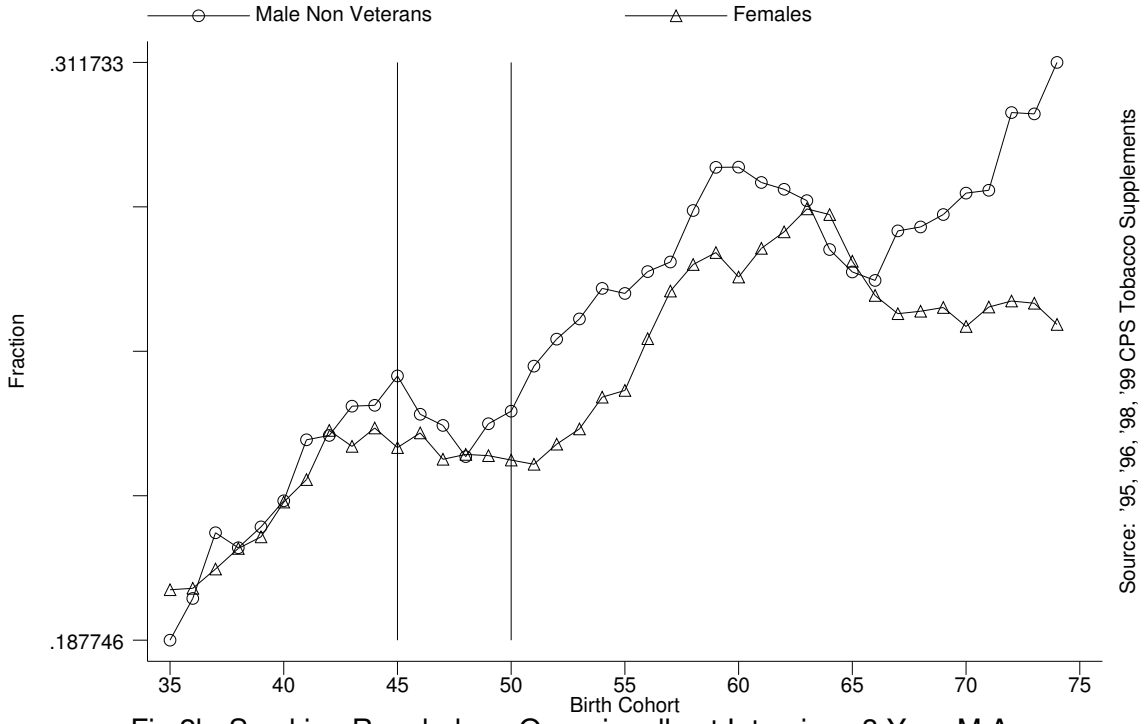


Fig 2b. Smoking Regularly or Occasionally at Interview–3 Year M.A.

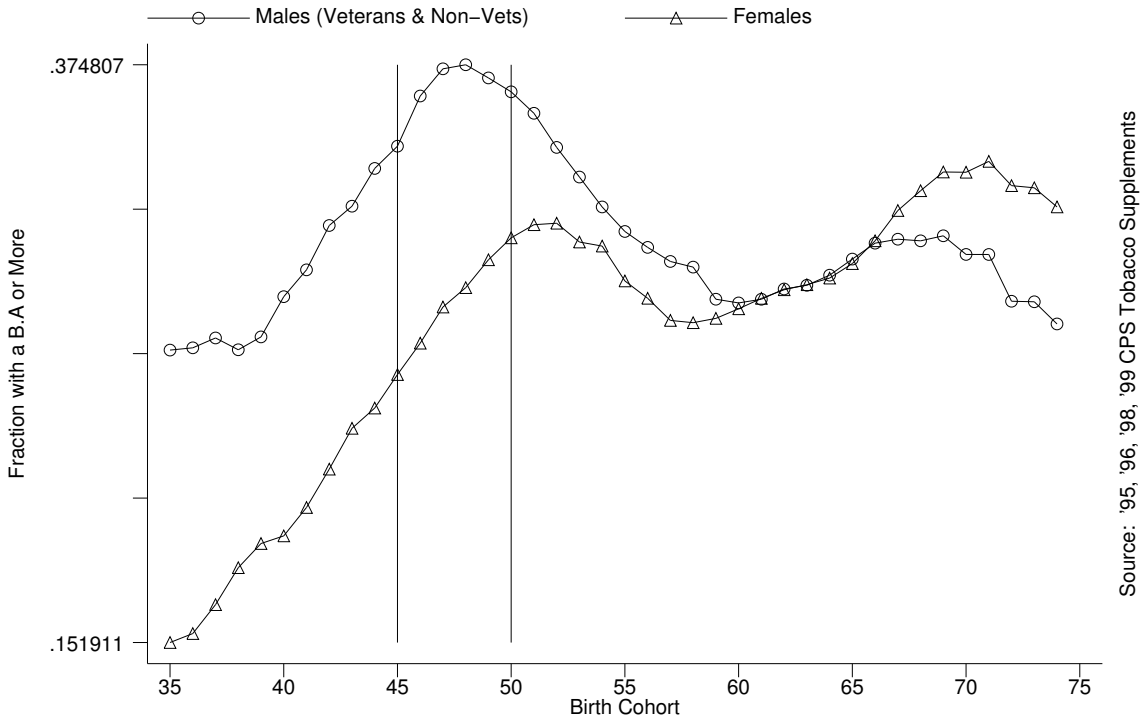


Fig 3a. Educational Attainment–3 Year Moving Average

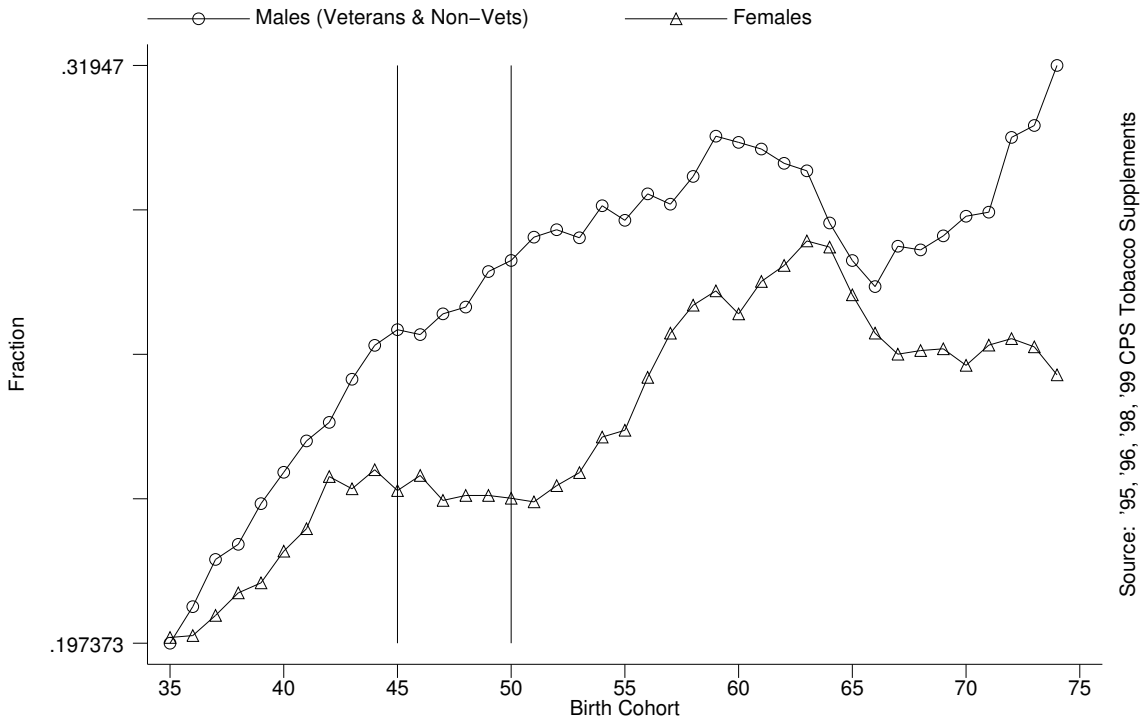


Fig 3b. Smoking Regularly or Occasionally at Interview–3 Year M.A.

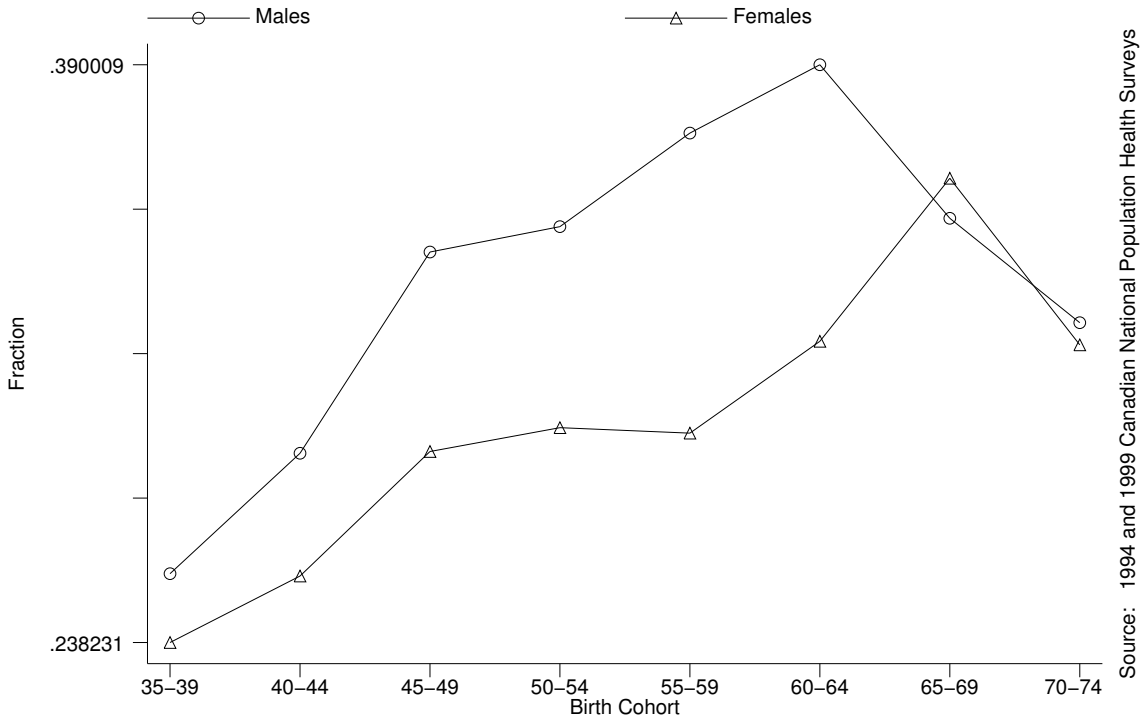
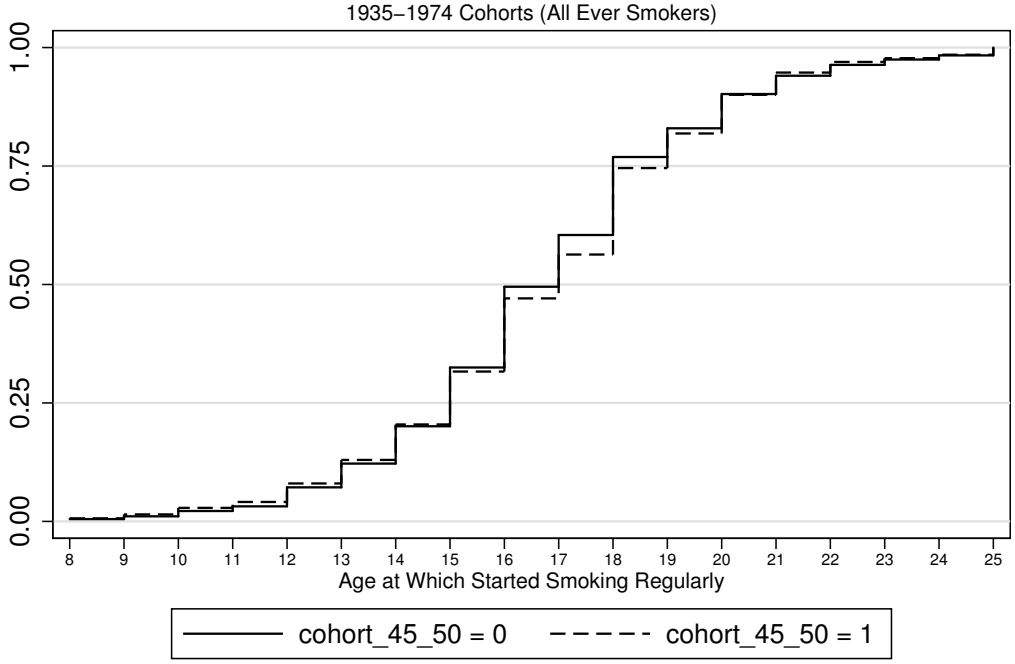
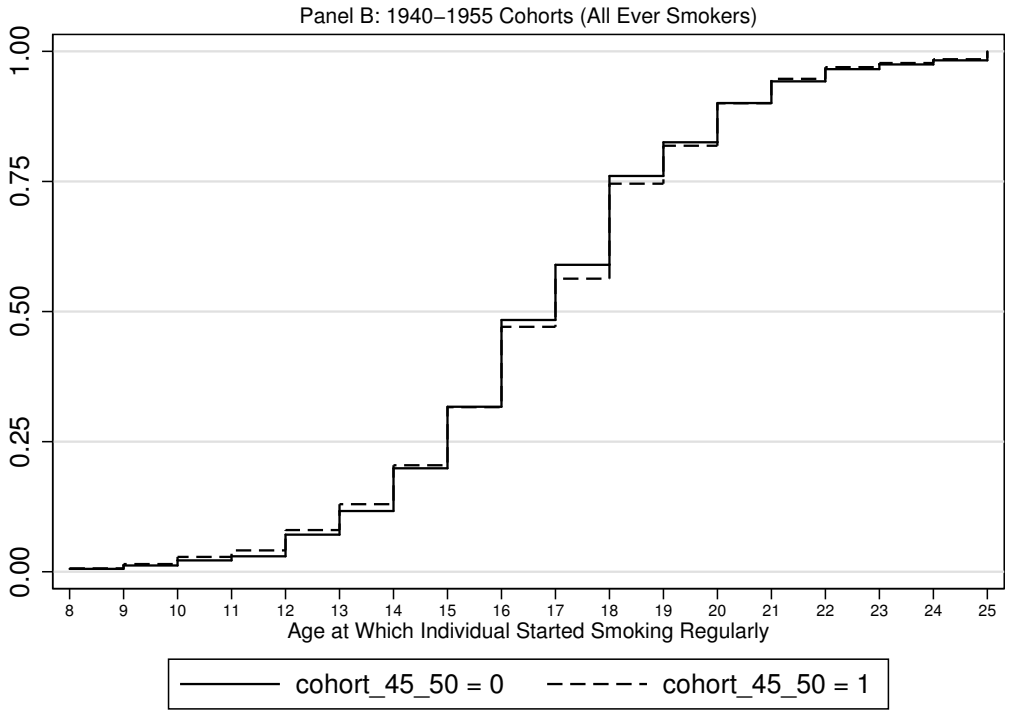


Fig 4. Regular Smokers in Canada

Figure 5. Kaplan–Meier Cumulative Distribution of Starting Ag




Panel B: 1940−1955 Cohorts (All Ever Smokers)
0.00
0.25
0.50
0.75
1.00
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
Age at Which Individual Started Smoking Regularly
cohort_45_50 = 0
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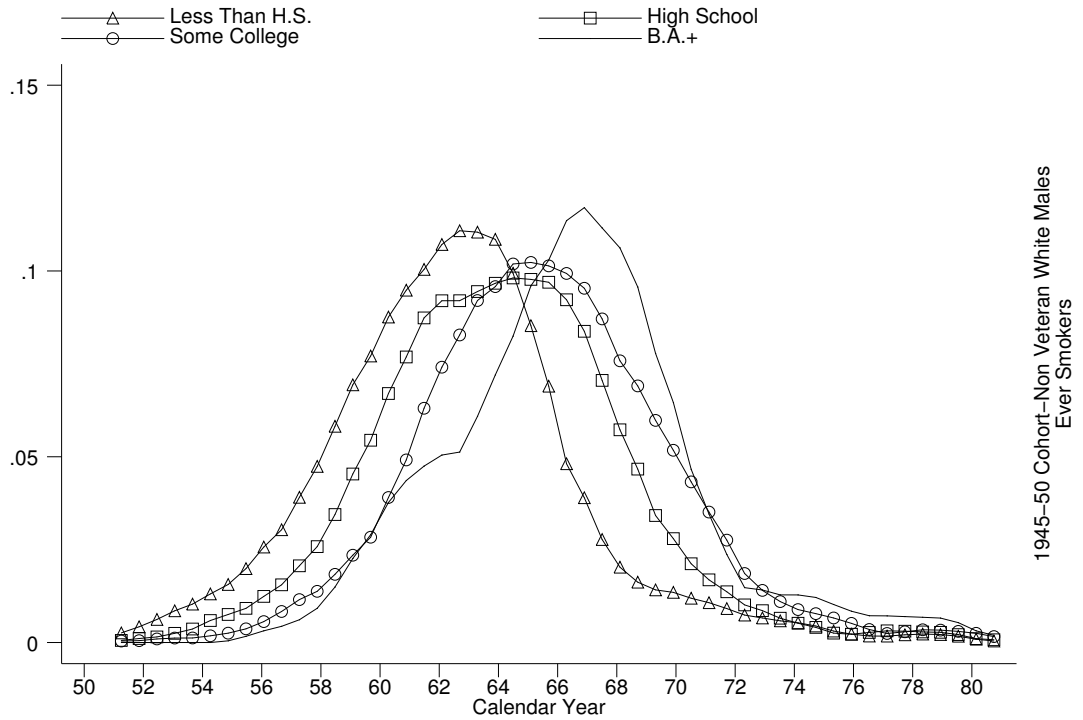

Figure 6. Distribution of Start Year By Educational Attainment