

**Explaining low high school attainment in Northern Communities:
An analysis of the Aboriginal Peoples' Surveys^{*}**

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Abstract

In 2005, only 37% of 20-25 year old Aboriginal individuals had completed high school in Northern communities compared to 74% for the rest of Canada. We use micro-data from the 2001 and 2006 Aboriginal Peoples Surveys (APS) to investigate the reasons for these large differences in high school attainment among Aboriginal peoples across regions in Canada. We begin by analyzing respondents’ reasons (‘wanted to work’, ‘bored’, ‘pregnancy’ etc.) for dropping out of high school and find no differences in these between Northern communities and the rest of Canada. This suggests that the differences in high school attainment between the two regions cannot be explained by these reasons. Next, we use the APS data to construct variables that could explain the gap in high school attainment between the North and the rest of Canada. Using a difference-in-difference method, we analyze the importance of these variables in explaining differences in high school attainment across regions. We quantify the difference in high school attainment between Northern communities and the rest of Canada for individuals aged 20-25. We then include the control variables in the regression and find that controlling for differences in these variables reduces the gap in high school attainment between the two regions by 63% for 2000 and by 57% for 2005. Hence, observable differences in curriculum and individual characteristics can account for a large proportion of the differences in high school attainment between Northern communities and the rest of Canada.

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1. Introduction

In 2000 (2005), only 28% (37%) of 20-25 year old Aboriginal individuals had completed high school in Northern communities (Nunavut, the Northwest Territories (NWT), the Yukon, Nunavik in the province of Québec and the Inuit settlement region of Nunatsiavut within Labrador) compared to 69% (74%) for the rest of Canada.¹ This paper aims to identify the factors causing high school graduation rates among Aboriginal individuals in the Northern communities to differ so significantly from those in the rest of Canada.

Understanding these factors is important for a number of reasons. First, with the highest birth rate in Canada, Northern communities are the youngest in the country. For example, approximately half of Inuit are under the age of 20, and 25% are below 10 years old (Statistics Canada (2006)). This entails that improving educational policy for the North is crucial to ensuring that the social and economic benefits of a high school education accrue to a large proportion of the Northern population. Further, given the recent surge in interest in the Arctic due to the pace of climate change, sovereignty issues and increased resource exploration, opportunities for skilled labour abound in the territory. If local inhabitants are to obtain such positions, a high school diploma is essential. Finally across the North, Aboriginal groups are negotiating resource settlements and pushing for self-government. High school and post-secondary graduates of the next generation are needed to ensure such efforts are sustained and properly managed.

This paper contributes to a number of different academic literatures. The education literature on the determinants of high school dropout puts forward a large number of potentially important factors (see for example Eckstein and Wolpin (1999), Kremer, Miguel and Thornton (2007), Lee and Burkham (2003), Dearden et al. (2005), Angrist and Lavy (2002), Bridgeland et al. (2006), Crane (1991), Guryan (2004), Perreira, Harris and Lee (2006)). These factors include an unstable family life or being raised by a single parent, cultural discontinuity with one's school, schools' academic streaming which seems to pre-determine success, parents' lack of education or low skill occupational status. The education literature also proposes a large number of barriers to Aboriginal education specifically in Canada (see Aylward (2010), Atleo and Fitznor (2010), Battiste and Henderson (2009), Battiste, Kovach and Balzer (2010), Berger (2005, 2009), Berger, Epp and Moller (2006), Eckerman (1998), DeGagne (1998) and Lethwaite and McMillan (2010)). Suggested barriers include poor school quality, the lack of mother tongue instruction in schools, perceived low economic rewards from schooling and a lack of community ownership of schools.

Although some empirical studies have examined reasons for dropout rates in Ontario (for example, Anisef and Johnson (1993) and Sullivan (1988)), our empirical study of the Aboriginal Peoples' Surveys (APS) would be the first to analyze the determinants of dropout rates for the Canadian

¹ Data from the 2001 and 2006 Aboriginal Peoples' Surveys (APS)

Aboriginal population, a sub-population experiencing very high dropout rates relative to the national average.

In the next section we introduce the data used in our analysis. Section 3 discusses the economic returns to a high school education in the Canadian North or factors that may influence the demand for a high school education. Section 4 describes variables in the APS which influence the production of human capital, or factors that influence the supply of high school graduation. Our regression results and decomposition of the gap in high school attainment between the two regions is presented in Section 5. Section 6 concludes and offers policy recommendations based on our results.

2. Data

We investigate the factors contributing to educational attainment in Northern Communities relative to the rest of Canada using micro-data from the 2001 and 2006 Aboriginal Peoples' Surveys. The APS provides data on the social and economic conditions (for example, health, language, employment, income, schooling, housing, and mobility) of Aboriginal people in Canada aged 15 and over. Given that a number of variables related to individual characteristics are contemporaneous, for example the reasons for differences in high school attainment across regions, we restrict our analysis to the 20 to 25 year old age group.

We begin by documenting the differences in high school graduation rates between Northern communities and the rest of Canada for 2001 and 2006 for the age group 20-25 years old (given in Table 1 below). We find that over the period from 2001 to 2006, the difference in the proportion that completed high school between Northern communities and the rest of Canada remained fairly constant. In other words, over the five-year period 2001-2006, we do not find evidence of catch-up in high school attainment for Northern communities.

Table 1: Proportion of the age group 20-25 that has graduated from high school		
Aboriginal peoples	2000	2005
Rest of Canada	69%	74%
Northern Canada	27%	31%
Source: Statistics Canada (2001) and Statistics Canada (2006)		

Among those that did not obtain a high school education, it is interesting to note that there are inter-regional differences in the timing of high school exit. Table 2 indicates that in Southern communities, graduation is most common, with very few students dropping out of school before grade

11. In contrast, in the Northern communities a quarter of students dropped out of high school in grade 10 in both 2000 and 2005.

Table 2: Timing of High School Dropout Among Population Aged 20-25					
Highest grade attained	Less than 8	9	10	11	12
Rest of Canada					
2000	4%	5%	10%	14%	67%
2005	2%	3%	8%	16%	71%
Northern communities					
2000	21%	14%	25%	14%	25%
2005	8%	17%	25%	17%	33%
Source: Statistics Canada (2001) and Statistics Canada (2006)					

2.2 Reasons for dropout

The APS provides responses to questions on reasons for dropping out from high school. We analyze differences in these responses between Northern communities and the rest of Canada. Table 3 provides the proportion of respondents that chose each reason for the two regions for the 2001 and 2006 surveys. The reasons with the highest percentage of respondents were ‘wanted to work’, ‘bored’ and ‘pregnancy’ for both regions and years. Using a regression we then examined whether there were statistically significant differences in these responses between the two regions and over the two surveys. We find that, except for ‘bored’ in 2006, the reported reasons for dropout were very similar for the two regions and years. This suggests that differences in the reported reasons for dropout cannot explain the lower high school attainment in Northern communities.

Table 3: Reported Reasons for High School Drop-out

	Rest of Canada		North Communities	
Reason for Drop-out	2001	2006	2001	2006
Want to Work	0.17	0.19	0.15	0.15
Had to Work	0.09	0.13	0.09	0.11
Bored	0.17	0.16	0.16	0.24**
Hard	0.07	0.05	0.03**	0.05
Pregnant	0.19	0.13*	0.20	0.14

Help Home	0.02	0.01	0.05*	0.05
Problem Home	0.06	0.05	0.03**	0.06
Access	0.00	0.00	0.02	0.02
Other	0.27	0.34**	0.29	0.22*

Note: *, **, *** indicate significance at 1%, 5% and 10% levels. It indicates that the difference between values for the same year is statistically significant.

3. Economic Incentives for Completing a High School Education

A straightforward question that arises upon witnessing the high rates of high school dropout in the Canadian North is whether or not it makes economic sense to complete a high school diploma in the North. In other words, perhaps dropping out of high school is a rational economic decision. We investigate this hypothesis using the APS data. To determine whether there are lower incentives for completing high school in Northern communities, we examine differences in unemployment rates and incomes for high school graduates and non-graduates between the North and the Rest of Canada.

We investigate differences in unemployment rates for high school graduates and non-graduates for the 20-25 year old age group by estimating a difference-in-difference regression equation with the dummy of unemployment as the dependent variable.² The results of the estimation are reported in Table 4. While the unemployment rate for 20-25 year olds with no high school degree in the Rest of Canada was 19.9% (estimate for constant), the unemployment rate was about 12% lower for high school graduates (estimate for grad). Given that estimates of all other variables (in particular the difference variables, North and North*grad) are not statistically significant, we conclude that there are no differences in unemployment rates for high school graduates and non-graduates between the North and the Rest of Canada.

Table 4: Unemployment Rates for Non-graduates and Graduates Across Regions in 2000 and 2005

Variable	Unemployment
constant	0.199
	0.00
<i>t</i> ₂₀₀₅	0.003
	0.92
<i>North</i>	0.005
	0.83
<i>North</i> * <i>t</i> ₂₀₀₆	-0.008
	0.85
<i>grad</i>	-0.118

² Unemployment = 1 if respondent is unemployed; otherwise =0.

	0.00
<i>grad</i> * <i>t</i> ₂₀₀₆	0.035
	0.30
<i>North</i> * <i>grad</i>	0.043
	0.27
<i>North</i> * <i>grad</i> * <i>t</i> ₂₀₀₆	-0.068
	0.22

Note: p-values below estimates.

To determine differences in the returns to a high school education across the two regions and time periods, we estimate the following regression equation:

$$\ln(Earnings_{ijt}) = \alpha_0 + \alpha_1 t_{2005} + \alpha_2 North + \alpha_3 North * t_{2005} + \beta_0 grad_{ijt} + \beta_1 grad_{ijt} * t_{2005} + \beta_2 North * grad + \beta_3 North * grad * t_{2005} + \gamma_0 AGE_{ijt} + \gamma_1 AGE_{ijt}^2 + \varepsilon_{ijt}$$

The dependent variable is the logarithm of earnings and, following the literature estimating the returns to schooling, we include controls for experience and experience-squared by including age and age-squared as explanatory variables. The results are provided in Table 5 below. Column 2 presents the results for the working age (20-65 year old) sample, while column 3 provides the results for the age group from 20-45 years old. The latter results may provide a better estimate of post-graduate earnings expectations for respondents in our sample. The estimate for *grad* for the 20-45 year old sample indicates that earnings for high school graduates were about 32% higher than that for non-graduates. . Further, the positive and statistically significant estimate for *North***grad* indicates that high school graduates in Northern communities earn about 19% more than high school graduates in the South, and the estimate of the difference-in-difference term, *North***grad** *t*₂₀₀₅, indicates that the advantage increased over the period 2000-2005.

To conclude, economic incentives seem to favour high school graduation, not only in terms of enabling individuals to find employment, but also in terms of providing a significant earnings premium in the North relative to the South. There is thus no evidence in favour of the ‘demand-side story’ that teenagers in the North opt out of high school because high school graduates are in relative over-supply.

Table 5: Returns to High school graduation: North and Rest of Canada

Variable	Age 20-65	Age 20-45
constant	6.489	4.827
	0.00	0.00
<i>t</i> ₂₀₀₅	0.200	0.199
	0.00	0.00
<i>North</i>	-0.007	-0.048

	0.84	0.22
<i>North* t₂₀₀₅</i>	-0.047	-0.083
	0.36	0.17
<i>grad</i>	0.348	0.316
	0.00	0.00
<i>grad* t₂₀₀₅</i>	-0.017	-0.005
	0.64	0.91
<i>North*grad</i>	0.152	0.188
	0.01	0.01
<i>North*grad* t₂₀₀₅</i>	0.135	0.190
	0.15	0.05
<i>Age</i>	0.146	0.256
	0.00	0.00
<i>Age²</i>	-0.002	-0.003
	0.00	0.00
<i>R²</i>	0.116	0.140

Note: p-values below estimates.

4. The Production of Human Capital

We now explore variables in the APS which may serve as determinants of the decision to complete high school, and thus of the difference in the supply of high school graduates between the two regions. We identify and construct 8 categorical variables related to high school outcomes in the APS.³ We classify these variables into two groups: schooling-related variables and individual-specific variables.

The first group of variables was constructed using responses to questions on whether the respondent was taught an Aboriginal language (Taught_ablang); whether the respondent was taught about Aboriginal people (Taught_ab); and whether the respondent was taught by an Aboriginal teacher (Teacher_ab) in high school. Table 6 presents the differences in these variables between the two regions and over time. While a similar fraction of respondents reported being taught about Aboriginal people, the two regions differed in teaching of an Aboriginal language and being taught by an Aboriginal teacher.

Table 6: Differences in Schooling-Related Variables

Variable	Rest of Canada		North	
	2001	2006	2001	2006
Taught_ablang	0.15	0.11	0.66	0.60
Taught_ab	0.72	0.54	0.72	0.67

³ The categorical variables are dummy variables that take a value of 1 if the statement is true; 0 otherwise.

Teacher_ab	0.29	0.23	0.72	0.60
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We then construct 5 variables that are individual-specific. Using responses to questions on a respondent's language ability, we construct a variable for ability to speak an aboriginal language (Speak_ablang=1, if respondent reported ability to speak an Aboriginal language; =0 otherwise). Aggregating information on reported incidence of certain diseases/conditions known to afflict children, we construct a summary variable for the health of a respondent (Health =1 if the respondent reported having any of these diseases/conditions; =0 otherwise).⁴ The variable Family_resch summarizes whether any family member of the respondent attended a residential school.⁵ The variable Smoke=1 if the respondent smokes and Not_moved=1 if the respondent did not move in the last 5 years.

Table 7 provides the summary statistics for the individual-specific variables for the two regions and years. There were significant differences between the two regions in Smoke and Not_moved, the prevalence of smoking was much higher and mobility was significantly lower in Northern communities.

Table 7: Summary Stats for Individual-Specific Variables

	Rest		North	
	2001	2006	2001	2006
Speak_ablang	0.20	0.10	0.76	0.60
Health	0.14	0.19	0.07	0.13
Family_ressch	0.16	0.20	0.14	0.40
Smoke	0.32	0.29	0.59	0.53
Not_moved	0.36	0.38	0.62	0.60

5. Regression Results and Decomposition

To determine the importance of the 8 categorical variables of interest in explaining differences in high school attainment between Aboriginal people in Northern communities and the rest of Canada, we estimate the following regression:

$$Grad_{ijt} = \alpha_0 + \alpha_1 t_{2005} + \alpha_2 North + \alpha_3 North * t_{2005} + \beta X_{ijt} + \varepsilon_{ijt}, \quad (1)$$

where the dependent variable $Grad = 1$ if respondent i in region j at time t attained high school; = 0 otherwise. The difference-in-difference setup of the regression includes a dummy variable for Northern

⁴ The chronic diseases we consider are: diabetes, asthma, chronic bronchitis, cancer, high blood pressure, heart problem, ulcer, hepatitis and tuberculosis.

⁵ Family members include: grandparents, parents, brothers and sisters.

communities (*North*), dummy for the year 2005 (t_{2005}) and an interaction variable ($North * t_{2005}$). The estimated coefficient for *North* provides the difference between Northern communities and other Canadian communities in 2000, the estimate for t_{2005} provides the difference between 2000 and 2005 and the estimated coefficient for the interaction term provides the difference-in-difference.

For the 20-25 year old age group, we estimate regression (1) without controls and then add control variables to determine how much of the difference in high school attainment can be accounted for by controlling for the effects of variables discussed in the previous Section. Table 9 presents the results of the estimation. The estimates without controls provide the difference in high school attainment between the two regions and over time. Given that the estimated coefficient for the interaction variable is not statistically significant, we conclude that the difference in high school attainment between the two regions did not change between 2000 and 2005.

The statistical significance of the estimated coefficients for the control variables indicates the importance of differences in these variables in explaining the gap in high school attainment. The estimates indicate that with the exception of *Teacher_ab* and *Health*, all other control variables are important for explaining the difference in high school attainment. Further, all other control variables, except being taught about Aboriginal people (*Taught_ab*), were associated with lower probability of high school attainment.

Comparing the estimated coefficients for *North* for the two regressions, we find that adding control variables reduces the difference between the regions from 42% to 15% for the year 2000. In other words, the control variables account for about 63% of the gap in high school attainment in the year 2000. For the year 2005 these variables can account for 57% of the gap in high school graduation. The variables indicating whether a respondent speaks an Aboriginal language or smokes are most important in explaining the difference between the regions in high school graduation.

Table 9: Difference-in-Difference Regression Results

Variable	Without Control	With Controls
constant	0.690	0.750
	0.00	0.00
t_{2005}	0.050	0.049
	0.00	0.00
<i>Inuit regions</i>	-0.418	-0.161
	0.00	0.00
$Inuit * t_{2006}$	-0.011	0.006
	0.75	0.85
<i>Taught_ab</i>		0.138
		0.00

Teacher_ab		-0.016
		0.44
Taught_ablang		-0.105
		0.00
Family_ressch		-0.092
		0.00
Speak_ablang		-0.173
		0.00
Smoke		-0.242
		0.00
Not_moved		-0.033
		0.04
Health		-0.003
		0.89
R^2	0.032	0.166

Note: p-values below estimates. Robust standard errors (Huber/White/sandwich estimate) used for computing p-values.

While the difference-in-difference regressions with and without controls provide suggestive evidence that the control variables can account for more than half the gap in high school attainment between the two regions, better estimates of the explained and unexplained difference can be obtained by undertaking the Oaxaca Decomposition. We estimate regression (1) separately for the two years (2000 and 2005); the results are presented in Table 10. We use the estimated coefficients and the differences in the means of the control variables presented in Tables 6 and 7 to calculate the explained gap in high school attainment for the two years.

The decomposition results reported in Table 10 suggest that about 60% (51%) of the gap in high school attainment in 2000 (2005) can be explained by differences in the 8 control variables that we consider.⁶ Three variables account for most of the explained gap in high school attainment for both years: Taught_ablang, Speak_ablang and Smoke. However, there are differences in the importance of control variables in explaining the gap in high school attainment for the two years. While Speak_ablang accounts for more than 50% of the explained gap in 2000, it only accounts for 21% of the explained gap in 2005. In contrast, Taught_ablang accounts for 16% of the explained gap in 2000 but its importance is higher 2005 (35%). Smoke maintains a high level of importance for the two years, 22% in 2000 and 37% in 2005.

⁶ Given that the estimated coefficients for Teacher_ab and Health are not statistically significant, difference in these variables between the two regions do not contribute to the explained component of the gap.

Table 10: Regression Results for 2000 and 2005

Variable	2000	2005
constant	0.701	0.830
	0.00	0.00
<i>North</i>	-0.154	-0.185
	0.00	0.00
Taught_ab	0.193	0.095
	0.00	0.00
Teacher_ab	-0.024	-0.013
	0.43	0.62
Taught_ablang	-0.072	-0.135
	0.02	0.00
Family_ressch	-0.073	-0.106
	0.01	0.00
Speak_ablang	-0.238	-0.082
	0.00	0.03
Smoke	-0.184	-0.291
	0.00	0.00
Not_moved	-0.042	-0.023
	0.06	0.32
Health	0.006	-0.011
	0.82	0.73
R ²	0.181	0.164
Decomposition:		
Explained	0.229	0.191
Unexplained	0.179	0.197
Total	0.408	0.388

Note: p-values below estimates. Robust standard errors (Huber/White/sandwich estimate) used for computing p-values.

In sum, we find that differences in incidence of being taught an Aboriginal language, speaking an Aboriginal language and smoking can explain about half of the gap in high school attainment of Aboriginal people between the North and the rest of Canada.

6. Conclusions and Policy Recommendations

Our analysis reveals some interesting findings for educational policy in the North. We find that a person's experience of being taught in an Aboriginal language accounts for 16% of the explained gap in high school completion in 2000, and that its importance is higher in 2005 (33%). In residential schools in Canada, children were prevented from using their native language and sometimes punished

for using it, while the importance of English and French was emphasized. This purposeful eradication of aboriginal languages has caused a backlash in schools across the country, so that many schools now see it as their role to revitalize indigenous languages. This is very much the case in the North where Inuit are the majority (in Nunavut and Nunavik). In Nunavik, Inuktitut has been the language of instruction from Kindergarten to Grade 2 since the mid-1970s. Grade 3 is taught half in English and half in Inuktitut, while from Grade 4 onwards, classes are taught in English or French. In Nunavut the 2008 the Inuit Language Protection Act gave parents the right to have their children educated in Inuktitut until grade 3, and by 2019 parents will have the choice of educating their children in Inuktitut throughout elementary and high school. The Northwest Territories Aboriginal Languages Plan (2010) set out a plan to preserve and strengthen the territory's nine Aboriginal languages.

Our results however corroborate a concern in the education literature that bilingual language programming may interfere with students' general academic performance, if both a student's first and second language skills are not being fostered. Collier (2009) notes that "we now know that the type of language needed for school includes not only all the domains of language (phonetics, phonology, inflectional morphology, syntax, vocabulary, discourse, pragmatics, and paralinguistics—including both structure and semantics), with all four language skills (listening, speaking, reading, and writing) to be mastered in each domain, but also use of all of these domains and skills within each subject area to be mastered (language arts, mathematics, science, social studies (Collier, 2009, page 512)."

This suggests that while the current emphasis on Inuit language instruction is important for cultural revitalization in the north, this may come at a cost of lower high school graduation rates if proper support for bilingualism is not provided. A key issue is recruitment and retention of teachers fluent in Inuktitut and other Aboriginal languages in the North.

While 'speak_ablang' accounts for more than 50% of the explained gap in 2000, it only accounts for 24% of the explained gap in 2005. We believe this result reflects that in the more isolated communities, where Aboriginal languages still thrive (largely in smaller communities of Nunavut and Nunavik), individuals are less likely to have parents who attended high school and fewer economic opportunities (and thus a perceived lower return to schooling). Our analysis therefore suggests that policy could focus on economic development initiatives for more remote communities in the North.

As noted above, status as a smoker maintains a high level of importance for the two years – explaining 22% of the high school graduation gap in 2000 and 37% of it in 2005. There is a large literature linking smoking, and substance abuse more generally, and early high school exit. Townsend, Flisher and King (2007) review this literature. They discuss a number of theories which explain why smoking often occurs among youth at risk of dropping out of high school. These theories all point to common pre-disposing factors for smoking and dropping out of school. For example, individuals that choose to drop out of high school may hold non-conforming attitudes, which are consistent with both smoking and abandonment of the 'student role'. Primary socialization theory asserts that when an adolescent's ties to family are weak, and to their peers are strong, the adolescent is most at risk for both

smoking and early school exit (Aloise-Young and Chavez 2002). Finally, strain theory proposes that students who do poorly academically may become frustrated with school and alienated from it. In an effort to define themselves through something other than academic success, they may turn to ‘deviant’ behaviours such as smoking, so that smoking and dropping out of school often coincide.

The Government of Nunavut recently launched an aggressive anti-smoking campaign called “Tobacco has no place here” in January 2012. The literature reviewed above suggests that such campaigns should be complemented with efforts aimed at addressing the common underlying causes of both smoking and school dropout – including counseling and academic support for adolescents.

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