

THE INTERGENERATIONAL LEGACY OF INDIAN RESIDENTIAL SCHOOLS*

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Abstract

From the late nineteenth century until the end of the twentieth century, colonial governments in the United States, Canada, Greenland, Australia, and New Zealand, operated, in collaboration with Christian churches, a network of boarding schools for Indigenous children. The purpose of this system was to culturally and economically assimilate; Indigenous children were taken from their families and placed into residential schools where they were to be converted into the Eurocentric culture of the dominant society. Using a unique restricted-access database from Canada that asked Indigenous respondents about their family history with residential schools, in addition to questions on a variety of socioeconomic outcomes, I study the intergenerational effects of these schools. Despite previous research showing that residential schools led to increased human capital accumulation among those who attended, I find that residential schools are associated with lower educational attainment among subsequent generations. I present evidence consistent with the notion that both cultural detachment and a breakdown in family relationships contributed to a reversal of the standard relationship between the human capital of parents and children. Encouragingly, I find that cultural interventions may provide a buffer to the harmful legacy of this historical trauma, suggesting an avenue for the direction of future policy.

JEL Codes: J24, J15, D83, I25, N30

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“Cultural genocide is the destruction of those structures and practices that allow the group to continue as a group. States that engage in cultural genocide set out to destroy the political and social institutions of the targeted group. Land is seized, and populations are forcibly transferred and their movement is restricted. Languages are banned. Spiritual leaders are persecuted, spiritual practices are forbidden, and objects of spiritual value are confiscated and destroyed. And, most significantly to the issue at hand, families are disrupted to prevent the transmission of cultural values and identity from one generation to the next.”

Truth and Reconciliation Commission of Canada, 2015

From the late nineteenth century until the end of the twentieth century, colonial governments in the United States, Canada, Greenland, Australia, and New Zealand, often in collaboration with Christian churches, operated a network of boarding schools for Indigenous children. The purpose of this system was to culturally and economically assimilate; Indigenous children were taken from their families and placed into live-in boarding schools designed to, *“break their link to their culture and identity”* (Truth and Reconciliation Commission of Canada, 2015b), by converting them into the Eurocentric culture of the dominant society. Perhaps nowhere was this process more deliberate than in Canada, where generations of students that passed through the schools were stripped of their cultures, resulting in a loss of Indigenous traditions, language, and community (Feir, 2016b).¹ Recently the process has been described as a type of “cultural genocide”, a term used to refer to the systematic destruction of traditions, values, and beliefs common to a group of people (Truth and Reconciliation Commission of Canada, 2015a).²

Despite the loss of culture associated with the residential school system, existing empirical evidence from Canada has found that they led to a causal increase in educational attainment among those who attended (Feir, 2016b). Paradoxically, a negative correlation has been observed between educational attainment and the residential school attendance of ones’ parents (Bougie and Senécal, 2010; Bombay, Matheson, and Anisman, 2014; Feir, 2016a). Although this link has not yet been established as causal, this correlation is in

¹The residential school system has been deemed an educational failure; in 2007, the Canadian federal government settled the largest class-action lawsuit in its history with 86,000 Indigenous peoples who had once attended the schools. Partly as reparation for the damages caused by the residential schools and partly as a way to combat growing inequality between Indigenous peoples and the rest of Canadians, the government of Canada has implemented several policies directed towards raising the educational attainment of Indigenous students. Yet despite these efforts, the education gap between Indigenous and non-Indigenous peoples persists: non-Indigenous students are roughly twice as likely to complete high school than Indigenous students (Wilson and Macdonald, 2010).

²In certain cases the Canadian residential school system has been compared to the segregation of black students during South Africa’s apartheid regime (Kallaway, 2002; Davis, Sumara, and Luce-Kapler, 2015) and to the segregation of African Americans in the U.S. South during the Jim Crow era (Lau, 2002).

contrast to much of the existing literature on the intergenerational transmission of human capital that suggests parents' and children's levels of human capital are positively correlated (Black, Devereux, and Salvanes, 2005; Oreopoulos, Page, and Stevens, 2006; Page, 2006; Black and Devereux, 2010).³ This paper explores the sources of this puzzle.

I show that children of residential school attendees are less likely to graduate high school than those whose parents did not attend residential school. By adulthood, the children of those who attended residential school are less likely to be employed, have worse self-reported health outcomes, but are more likely to engage in traditional activities like hunting, gathering, trapping, and fishing. Due to the limitations of the existing data, formally accounting for the systematic selection of students into residential schools using existing methods is not possible.⁴ I therefore use the methodology of Oster (2019) to assess the stability of my coefficient estimates. This methodology uses movements in coefficient estimates and the R-squared induced by adding observable characteristics to the model to infer information about unobservables. While the Oster (2019) methodology is not a causal methodology itself, it provides evidence in support of a causal interpretation. The results in this paper are robust to this exercise.

Given the link between various non-market outcomes and high school graduation (Heckman et al., 2017a,b), I then focus on the channels through which the high school graduation rate is affected by parental residential school attendance. There are two prevailing theories that explain how the residential school system has contributed to contemporary education disparities. One explanation is that the systematic undermining of Indigenous culture that occurred at the schools left generations of Indigenous peoples distrustful of mainstream educational institutions and that these attitudes have persisted intergenerationally (Thibodeau and Peigan, 2007; Bombay, Matheson, and Anisman, 2013; Loppie, Reading, and de Leeuw, 2014; Feir, 2016a). In a theoretical context, this intersection of culture and human capital is consistent with a model of utility maximization where utility is determined by both education and social identity (Akerlof and Kranton, 2002). The alternative explanation is that the intergenerational fallout of residential schools left many individuals without strong role models for parents (Evans-Campbell, 2008; Bombay et al., 2011; Truth and Reconciliation

³For a larger overview of this work, see Black and Devereux (2010).

⁴For instance, Feir (2016b), uses a set of instrumental variables, including the distance between individuals' home communities and the closest residential school, the national trend in residential school enrolment, and the percent catholic in individuals' communities to study the relationship between residential school attendance and outcomes for those who attended the schools. Unfortunately, to replicate these results for those whose parents attended would require knowledge of parents' home communities, which is unavailable in the existing data sources. Similarly, Gregg (2017) focusses on the United States and uses distance to the closest Indian boarding school to instrument for the share of reservation members who attended residential schools in the past.

Commission of Canada, 2015a), which in turn affected the investments residential school survivors made in their own children.⁵ The breakdown in the intergenerational transmission of human capital resulting from this explanation is in line with a model where cognitive skills are the outcome of a production technology where the inputs include aspects of parental investment (Todd and Wolpin, 2003; Cunha et al., 2006; Heckman, 2008).

Overall, while the empirical evidence supports a middle ground between the two explanations, I find that there is an important mitigating role for cultural interventions to reduce the negative impacts of residential schooling.⁶ Using information on where individuals live suggests that the negative correlation between parental residential schooling and children’s educational outcomes is only present off-reserve, where First Nations and parents have less influence over the extra-curricular activities offered and the pedagogies used in the classroom.⁷ To further explore whether access to initiatives intended to support ones culture have the potential to mitigate the negative impacts of residential schooling, I assemble a supplementary dataset using public-access data on educational attainment by First Nation, which I combine with an indicator for whether a First Nation has a cultural centre. Using proxies for historical residential school exposure that are consistent with the work of Feir (2016b) and Gregg (2017), I show that the relationship between these proxies and contemporary educational attainment is reversed for First Nations with access to a cultural centre.

This paper makes two primary contributions to the existing literature. Broadly speaking, it builds on a growing body of work quantifying the impacts of colonial policies in North America that have impacted Indigenous economic development throughout the nineteenth and twentieth centuries. This includes the forced coexistence of Indigenous nations without a shared history of governance (Dippel, 2014), fractionation on reservations (Russ and Stratmann, 2014; Leonard, Parker, and Anderson, 2020), the decimation of the bison on the

⁵This may be due, in part, to the destruction of Indigenous language which made communication between students and their parents and grandparents difficult and sometimes nonexistent once they left residential schools (Partridge, 2010).

⁶The fact that the legacy of residential schools operates through multiple channels is consistent with existing qualitative work in the area. For instance, from interviews with three residential school survivors, Ing (1990) suggests that the psychological and cultural loss of self-esteem, child-rearing patterns, and Indigenous language will all have adverse impacts on subsequent generations.

⁷Since the 1990s, the Government of Canada has signed a series of modern treaties with Indigenous nations that have resulted in varying degrees of self-governance across nations, including regarding control of education on reserves. In 2017, the Government of Canada supported community gatherings across the country to gain perspective on the most important issues related to First Nations education to ensure student success. These gatherings were then supplemented by a survey for communities that had not participated in the gatherings. Across the board, it was reported that language, culture, and history of First Nations people should be an important part of school curricula and that this should include traditional activities and land-based learning (Government of Canada, 2018).

Great Plains (Feir, Gillezeau, and Jones, 2019), and the terms of historical treaties signed between Indigenous nations and the state (Feir et al., 2020). A subsection of this work has focussed specifically on education-related policies (Feir, 2016a,b; Gregg, 2017; Auld and Feir, 2020; Jones, 2020). To this end, this paper advances our understanding of the legacy of colonial education policies by providing quantitative evidence of the link between parental residential school attendance and outcomes relating to human capital, employment, health, and culture among the adult children of residential school attendees.

Arguably, the most rigorous analysis of the impact of residential schools in Canada is Feir (2016b), who shows that the residential school system increased high school graduation and employment and lowered the probability of receiving social assistance for those who attended; however, this was at the expense of Indigenous culture, where residential school attendees were less likely to speak an Indigenous language, participate in traditional activities, and more likely to live away from their traditional communities.⁸ In a follow-up piece, Feir (2016a) finds that children whose parents attended a residential school in Canada have worse schooling experiences than those whose parents did not, a result that is at odds with the work of Gregg (2017) who shows, at the community level, that greater exposure to historical Indian boarding schools is related to better economic outcomes in Indigenous communities today.

Gregg (2017) suggests that the experience at Indian boarding schools in the United States may have been different from that in Canada due to the fact that parents had to consent to attendance by 1911, whereas parental consent was not required in Canada until much later; however, my results provide a separate explanation to reconcile the findings of these two papers. Feir (2016a) uses individual-level survey data that includes children living both on- and off-reserve. Gregg (2017) focusses on reservation-level outcomes. The heterogeneous effects I uncover by whether students live on- or off-reserve are consistent with the different data choices made in Feir (2016b) and Gregg (2017) and provide insight into the cultural buffer that reserves may create for Indigenous resilience and wellbeing. This distinction is important, as it complements other work highlighting the unique policy considerations of the reserve population (see, e.g., Jones (2020)).

The second contribution of this paper relates to the literature on the intergenerational transmission of human capital. This literature has demonstrated that the educational attainment of parents and children tends to be positively correlated and has generally tried to

⁸Existing work studying the intergenerational impacts of residential schools on educational outcomes have focused on children (Bougie and Senécal, 2010; Feir, 2016a), and the existing work on employment has been at the community-level (Gregg, 2017). Health outcomes have been studied extensively, with parental residential school attendance being correlated with suicide and depression in both adults (Bombay et al., 2011; Elias et al., 2012) and youth (Moniruzzaman et al., 2009).

disentangle selection from causation (Black et al., 2005). That is, it has sought to determine whether parents who obtain high levels of education have children who obtain high levels of education because of a correlation between the innate ability of parents and children or because education influences the way in which people parent. At this point, the evidence suggests that both selection and causation contribute to the intergenerational transmission of human capital, suggesting that there may be an important intergenerational component of policy interventions aimed at increasing educational attainment (Black et al., 2005; Oreopoulos et al., 2006; Page, 2006; Black and Devereux, 2010). That being said, the negative correlation observed between parental residential school attendance and children’s education is at odds with this existing literature, providing an example of the conditions under which this relationship has the potential to break down. Specifically, the mechanisms investigated in this paper suggest that family ties, culture and institutional trust can play an important role in human capital acquisition, especially when parents’ past experiences with schooling have been contentious or where those delivering education have not sought to incorporate elements of an individual’s culture or identity.

From a policy perspective, discussion should obviously not center on whether or not residential schools should be reimplemented. Rather, it should be about the types of policies that can help increase Indigenous participation in education and foster an inclusive environment in educational institutions for Indigenous populations. If culture is an important factor for the accumulation of human capital, then programs and curricula that incorporate Indigenous traditions and knowledge are vitally important for reducing disparities in schooling between children whose parents attended a residential school and those whose parents did not. As such, these programs likely also play an important role in reducing gaps between Indigenous and non-Indigenous students more broadly. This paper therefore recommends an avenue towards increasing equality of opportunity for Indigenous students. The remainder of the paper proceeds in the usual manner.

2 History of Residential Schools in Canada

Between 1867 and the mid-1990s the Canadian government, in collaboration with Christian churches, operated a network of residential schools for Indigenous children. Approximately 150,000 children were removed from their homes and placed in isolated live-in institutions where they were forbidden to speak their native languages or participate in any cultural or spiritual practices. Figure 1 displays Cree student Thomas Moore, often considered the face of this assimilation policy in Canada. The left panel displays Moore prior to his admission to the Regina Indian Industrial School in 1904 wearing traditional attire, his hair long and wrapped in fur, left hand holding one of his braids—indicative of his Cree identity—and his

right hand clutching a gun—supposedly symbolic of “savagery”. In the panel to the right, he is slightly older, dressed in European style clothing, his hair short, one arm leaning against a pillar and the other hand on his hip, in a non-threatening demeanour. Moore’s transformation is a clear display of the process of acculturation that was at the heart of government policy during the time period.

Although Canada’s Residential School System began as a formal institution after confederation in 1867, early residential schools can be traced to French Canada during the seventeenth and eighteenth centuries and Mission schools in the Canadian West during the mid eighteen-hundreds (Milloy, 1999; Truth and Reconciliation Commission of Canada, 2015a). The residential school system that has become synonymous with forced assimilation in Canada is rooted in a broad group of British colonial policies that predate the height of the system itself (Milloy, 1999; Truth and Reconciliation Commission of Canada, 2015a). While several different reasons have been used to justify European colonialism, they were largely elaborations on the idea that God gave Christian nations the right to colonize lands they discovered as long as they converted the Indigenous populations to Christianity and brought the benefits of civilization, in the European context of the word, which usually meant imposing European style institutions, cultures, and belief systems (Truth and Reconciliation Commission of Canada, 2015a).

This mentality was central in guiding the direction of government policy relating to Indigenous peoples after confederation, when the Canadian government was granted legislative jurisdiction over, “*Indians and lands reserved for Indians*” (Canadian Constitution Act of 1867, 91(24)). At this time, the Canadian Confederation included only the former British colonies of Nova Scotia, New Brunswick and “Canada” (essentially modern-day Southern Ontario and Southern Quebec), but expansion into the western part of the territory was imminent. To facilitate westward settlement, the Canadian government negotiated a series of treaties with Indigenous groups across Western Canada, which outlined the federal government’s obligations with respect to education and health care, and were supposed to help Indigenous communities transition into well-functioning agrarian economies (Daschuk, 2013).

The treaties outlined relatively ambiguous statements regarding the fiduciary obligations towards education. For example, the 1871 treaty signed between the Queen and the Chippewa and Cree Indians of Manitoba and surrounding area (see Figure 2(a)) specified that, “*Her Majesty agrees to maintain a school on each reserve hereby made whenever the Indians of the reserve should desire it*”, while the 1877 treaty signed between the Queen and the Blackfoot (and other) tribes—Figure 2(b)—stated, “*Her Majesty agrees to pay the salary of such teachers to instruct the children of said Indians as to Her Government of*

Canada may seem advisable, when said Indians are settled on their Reserves and shall desire teachers.” Regardless of the true intention of the original school-related clauses in the treaties, Indigenous peoples recognized the importance of education and the potential for the treaties to bring economic stability in the face of an uncertain future (Carr-Stewart, 2001; Stonechild, 2006). This was especially true for Indigenous groups in the prairies who had been decimated by the near extinction of the bison—their traditional source of livelihood—in the ten year period following confederation (Milloy, 1999; Daschuk, 2013).

To address the promises regarding education that were made during the treaty period and under the belief that effectively educating Indigenous children required that they be removed from the influences of their parents (Milloy, 1999), the government moved to implement the residential school system. By the early 1930s, there were a total of eighty schools in operation across the country. Figure 3 displays the location of all residential schools and Indigenous communities in Canada.⁹ The residential school system fit in with the broader policy of assimilation, but from the government’s perspective was of particular importance due to the perception that adult Indians were, as J.A. Macrae, Inspector for the Department’s North West Schools said, *“physically, mentally, and morally [...] unfitted to bear such a complete metamorphosis.”* (Milloy, 1999). Thus, in the view of the Department of Indian Affairs, it was the transformation of children that was paramount to the cultural assimilation of Indigenous peoples more generally.

Although early attempts to mandate that children attend residential schools for a fixed number of years were unsuccessful,¹⁰ legislation passed in 1924 required that all Status Indians from the age of 7-15 attend either a residential school or a day school (Indian Act, 1924, Section A10(1)). Enforcement of this legislation was the responsibility of the Indian agents assigned to each reserve (Indian Act, 1924, Section A10(3)), and ultimately they remained the sole authority to determine whether or not a child was admitted to a residential school versus a day school (LeBeuf, 2011).

⁹Sources for the location of schools are: The Aboriginal Healing Foundation <http://www.ahf.ca/downloads/residential-school-directory.pdf>, the Anglican Church of Canada <http://www.anglican.ca/tr/histories/>, and the Newfoundland and Labrador Lawsuit Against Residential Schools <https://kmlaw.ca/cases/newfoundland-residential-schools/>. These were matched to either Census Subdivisions, Census Divisions, or Census Metropolitan Areas, and centroids were computed in QGIS from Statistics Canada’s geographic boundary files, located at: <https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-eng.cfm>.

¹⁰Initially the attendance policy outlined by the Department was ambiguous. For instance, in the 1896 Departmental Annual Report it was stated that the department’s policy *“has been that boys should remain at the industrial-schools until they attain an age at which [...] their characters shall have been sufficiently formed as to ensure as much as possible against their returning to the uncivilized mode of life.”* More structured attempts to create legislation regarding attendance were also unsuccessful. A contract in 1911 proposed that residential schools admit students between the ages of seven and eighteen, though this contract was never reviewed (Milloy, 1999).

The schools were run by Christian churches and operational costs were funded by the federal government, which meant that even though the Indian agents retained exclusive control over who was admitted to the schools, the churches still had a heavy hand in recruiting students. Government funding was allocated to the schools on a per student basis, thus it was in the interest of the church to recruit the maximum number of pupils, both because their funding depended directly on the number of students in attendance, and because of the belief that they would be rewarded by God for converting Indigenous children to Christianity. This misalignment of incentives led to the targeting of children who were, “*orphans and children without any persons to look after them,*” and those who were, “*physically and intellectually unfit*” (Milloy, 1999).¹¹ On the other hand, the degree to which Indian agents recruited students varied across agents. The recruitment was often viewed as extra work by the agents, and some opposed the schools altogether, stating that they, “*performed in a perfunctory manner*” (Milloy, 1999).

By the end of the Second World War the popularity of the schools was in decline. It was not clear to the Department that the schools had upheld the original vision of graduating, “*a generation of well-educated, re-socialized children who were subsequently enfranchised and integrated into the life of non-Aboriginal communities*” (Milloy, 1999). The government began a gradual phase-out of the residential schools, shifting in favour of integrating Indigenous students into day schools or public schools. However, the timing and the location of the phase-out was heavily influenced by the Catholic church (Satzewich and Mahood, 1995; Milloy, 1999), who resisted the closure of the Catholic residential schools.

As the residential school system was phased out, a new criticism of the schools emerged, which promoted the idea that to successfully educate Indigenous children, schools would have to be sympathetic to Indigenous cultures (Milloy, 1999). By 1969, the federal government had taken full control of the schools from the churches. This shift in ideology regarding curricula targeted to Indigenous children and the transfer of responsibility to the government suggests that it is important in the empirical section to evaluate the effect of parental residential school attendance on children’s outcomes separately for different age groups.

3 Data and Sample Selection

To identify the effect of a parent having attended residential school on the adult child’s outcome requires knowledge of parental history of residential schooling, in addition to mea-

¹¹The schools were notoriously underfunded, which increased the incentive to recruit more students than there was space. In 1931 the average per capita was set at \$172 CAD, while at schools for deaf students per capitas were \$642 CAD, at boys schools they were \$294-\$362 CAD, large U.S. child-care institutions were \$541 USD and smaller ones were \$313 USD (Milloy, 1999).

asures of the adult child’s outcomes. This information is available in the 2001, 2006, and 2012 Aboriginal People’s Surveys (henceforth, APS). The APS is a post-censal survey that, since 1991, has been administered every 5 years to individuals who identify as Indigenous on the Census of Population in one of four ways: by reporting that their ancestors belong to an Indigenous group, by self-identifying as Indigenous, by indicating that they belong to an Indian band, or by stating that they are registered with the federal government as a Status Indian. The first year that the APS asked respondents questions about family members’ exposure to residential schools was in 2001.

Although the APS is a voluntary survey, it typically has a high response rate, with 84%, 80%, and 76% responding in 2001, 2006 and 2012, respectively. The 2001 APS included both the on- and off-reserve populations, while the 2006 and 2012 waves covered the off-reserve population only.¹² The APS is unique in that it contains data on a broad range of topics that are particularly important for understanding socio-economic factors that specifically affect Indigenous people. It covers both adults and children and provides separate questionnaires to people of First Nation, Inuit and Métis background. Questions focus on standard socio-economic issues like health, employment, income, and schooling but also address a variety of cultural proxies like language, involvement in traditional Indigenous practices like hunting and fishing, use of traditional medicine, and central to the analysis in this study, family members’ exposure to residential schools.

In order to understand how a parent’s experience at residential school may affect their child’s outcomes, I must restrict the sample to focus on individuals who know their parents’ history of residential schooling. Of these individuals, 6.3% attended residential school themselves, while 6.2% of individuals who do not know their full family history of residential schooling attended a residential school themselves.

Table 1 presents descriptive statistics for those who know their family history of residential schooling. The reported means are split based on whether or not the individual reported having a parent who attended residential school. Difference in means tests are also reported. In some specifications I choose to restrict the sample to those in the western provinces (British Columbia, Alberta, Saskatchewan, and Manitoba), as these individuals tended to have fewer rights to self-government, which would affect their power to resist their children being taken to the schools. Thus we may expect any impact of parental residential school attendance to be larger for these individuals. This restriction is in line with Feir (2016b) and Feir (2015) and helps to provide a comparison with these analyses. The last

¹²The APS, like the long-form census, does not include people who live in hotels or motels, hospitals, missions, group homes or jails, etc. If any of these outcomes correlate with a parent having attended a residential school, the results of this paper will under- or over-state the parental residential school effect.

three columns of Table 1 therefore report summary statistics for those living in the western provinces.

It is immediately clear from looking at Table 1 that there are large differences in the characteristics of those whose parents attended a residential school and those whose parents did not. Some of these differences are consistent with the objectives of the residential school system. The system was originally intended for Status Indian children, and since First Nations are the only Indigenous group eligible to become Status Indians, we should expect to see a greater proportion of Status Indians, First Nations, those living on-reserve, and those who have attended residential schools themselves among individuals whose parents attended a residential school. Individuals whose parents attended a residential school also tend to live closer to one of the now defunct schools. Many of these differences are larger among those living in the western provinces.

We also see large differences in the outcomes of those whose parents attended a residential school compared to those whose parents did not. The largest difference in schooling outcomes is reflected in the high school graduation rate. Students whose parents attended a residential school are 16.8 percentage points less likely to graduate high school compared to those whose parents did not attend a residential school. In the western provinces, this difference increases to 18.5 percentage points. Other outcomes that are considered are related to higher education, employment, health, and involvement in traditional activities. The raw differences suggest that children of residential school survivors are less likely to have a post-secondary certification, less likely to be employed, are in worse health, and participate in more traditional activities.

While the children of residential school survivors are also less likely to have a post-secondary certification of any kind, these differences are an order of magnitude smaller than the high school graduation gap. Given the vast difference in high school graduation rates between students whose parents attended a residential school and those who did not, and the fact that high school graduation is important for a wide range of market and non-market outcomes, the empirical section will pay close attention to understanding differences in the high school graduation rate.¹³

¹³Increased educational attainment has been associated with reductions in criminal activity (Lochner and Moretti, 2004), increased health outcomes (Grossman, 2006; Heckman et al., 2017b,a), and higher levels of civic participation (Dee, 2004; Campbell, 2009).

4 Empirical Methodology and Results

The main empirical specification models outcomes as a function of parental residential school attendance and individual characteristics:

$$Y_{irt} = \alpha + \gamma \text{RS_parent}_{irt} + \mathbf{X}_{irt}\boldsymbol{\beta} + \psi_r + \zeta_t + \epsilon_{irt}, \quad (1)$$

where, as before, Y_{irt} is the outcome under consideration; most notably, an indicator for the child having graduated from high school and RS_parent_{it} is an indicator for the parent having attended a residential school. For the main analysis, I focus on respondents who know the history of their parents' residential schooling. The controls in the matrix \mathbf{X}_c include dummies for the APS wave, whether the respondent lives on- or off-reserve, gender, whether the respondent is First Nation, Métis, or Inuit. Also included are fixed effects for the census subdivision in which the respondent resides ψ_r and the respondent's year of birth ζ_t .¹⁴

The estimate $\hat{\gamma}$ will be biased if there are unobserved components in the error term ϵ_c that are simultaneously correlated with a parent having attended a residential school and a child's likelihood of completing high school. This would be particularly problematic if students were systematically selected into residential schools on the basis of characteristics that were observable at the time of selection but are not observable to the econometrician today. As the historical background would suggest, this is likely a relevant concern, as selection into residential schools was not random. Students who, the absence of residential schools, would have been the least likely to attend school were disproportionately selected to attend residential schools. The per-student funding of the schools meant that often orphaned or neglected children were selected to attend first. To the extent that there is a intergenerational component to the factors underlying the selection process, then these unobservables will also be correlated with the educational attainment of those whose parents attended a residential school. This would negatively bias the coefficient estimate $\hat{\gamma}$.

[Feir \(2016b\)](#) quantifies the extent of selection into residential schools for those who attended. Specifically, [Feir \(2016b\)](#) calculates the correlation between the error term in a regression of high school graduation on residential school attendance and the error term in a regression of residential school attendance on its determinants to be -0.208, which implies that a regression of high school graduation on residential school attendance would produce a coefficient on residential school attendance that is biased downwards. Without accounting for selection, [Feir \(2016b\)](#) finds that residential schools increased the likelihood of graduating

¹⁴Specifications that account for distance to the closest historical residential school, in place of census subdivision fixed effects, are nearly identical.

by 7 percentage points.¹⁵ Using national trends in residential school enrolment, distance to the closest residential school at schooling age, and variation in the Catholic church’s influence, as exogenous variation in residential school attendance the effect of attending a residential school on high school graduation rates increases to between 13.6 and 14.9 percentage points depending on the instruments used.

While it might be reasonable to assume that the effect of selection into residential schools is larger for a parent’s schooling outcome than their child’s schooling outcome, it would not be advisable to assume that selection is altogether absent from specifications attempting to quantify the intergenerational effects of residential schools. A natural extension of Feir (2016b) would be to reconstruct the instrumental variables for parental residential school attendance to evaluate the effect on children’s outcomes. To do this requires information on parent’s age and community of origin. Unfortunately, the APS does not contain any additional information on parental characteristics besides whether or not they attended a residential school, which makes construction of the original instruments problematic. Furthermore, the APS cannot be linked to past censuses to obtain family characteristics due to technical infeasibility. Therefore, to address the potential endogeneity of parental residential school attendance under the limitations of the available data, I supplement the OLS results with the methodology of Oster (2019). This framework is an extension of the work of Altonji et al. (2005) which effectively bounds the selection on unobservables under a proportional selection hypothesis, while taking into account movements in the R-squared induced by adding controls. Following the recommendations of Oster (2019) I assume that the selection on unobservables equal to that of observables, and I set the maximum allowable R-squared to be equal to 1.3.¹⁶ In the Appendix I perform an additional sensitivity analysis using the methodology of Altonji et al. (2005) where I bound the estimates of the parental residential schooling effect using the estimates of selection computed by Feir (2016b).

4.1 High School Graduation

Figure 4 displays the evolution of high school graduation for students born between 1925 and 1990. The figure is constructed by pooling the 2001, 2006, and 2012 APS and grouping students into year of birth cohorts and by whether or not they have at least one parent who attended a residential school. Each black dot represents the graduation rate of students born in the corresponding year who do not have a parent who attended a residential school (or do not know whether either of their parents attended a residential school), and each red dot

¹⁵This figure is based on the marginal effect from a probit regression of high school graduation on residential school attendance and a number of controls.

¹⁶This value for the maximum R-squared is a threshold for which 90% of randomized control trials in leading economics journals would survive.

represents the graduation rate of students born in the corresponding year who have at least one parent who attended a residential school. Starting with cohorts born in approximately 1940 a gap begins to emerge between the high school graduation rates of those born to residential school survivors and those whose parents did not attend residential school. By 1975 this gap is large—approximately 10 percentage points—and remains large for cohorts born in 1990. The main objective of the ensuing empirical section is to quantify the magnitude of this gap, accounting for observables and potential selection issues surrounding residential school attendance, and then to examine the mechanisms that may explain the differences in high school graduation between those whose parents attended residential school and those whose parents did not.

The results from estimating equation 1 using OLS are presented in Table 2. In each column, the dependent variable is an indicator for whether or not the individual graduated from high school and 0 otherwise. Each column adds an additional control or set of controls from the previous column to examine how the coefficient of interest $\hat{\gamma}$ varies with the addition of observable characteristics. All columns include dummies for the survey wave—either 2001, 2006, or 2012 APS—so that the results of column (1) will differ slightly from the summary statistics.

In each column, the effect of having a parent attend a residential school is statistically different from 0 and economically meaningful. The magnitude of the estimate of the impact of parental residential school attendance is reduced by nearly 3 percentage points with the addition of indicators for First Nations, Métis, and Inuit identity, and a further 2 percentage points once a control is added for whether the individual is registered with the federal government as a Status Indian. An important control for our analysis is the indicator for whether the individual themselves attended a residential school. To the extent that the portion of the unobserved component that is simultaneously correlated with own residential school attendance and high school graduation is also correlated with the portion of the unobserved component that is simultaneously correlated with parental residential school attendance and high school graduation, including this variable will help reduce omitted variable bias. Reassuringly, the estimate of parental residential school attendance changes very little with the addition of this control, suggesting that this source of bias may be less of a concern for the intergenerational relationship between residential school attendance and high school graduation than the relationship between own residential school attendance and high school graduation.

In the final column, where I include the full set of controls and fixed effects, the coefficient estimate suggests that students whose parents attended a residential school are nearly 6.5 percentage points less likely to complete high school. Applying the [Oster \(2019\)](#) correction

to this coefficient suggests an intergenerational residential school effect of approximately -1.5 percentage points (unreported in the table). While this result is quite different in magnitude from the OLS estimate, both estimates point to the conclusion that the residential school system has had a lasting negative impact on human capital attainment among Indigenous peoples in Canada.

The intergenerational impact of residential schooling is even larger for those living in the Western provinces, as shown in Table 3. For those living in British Columbia, Alberta, Manitoba, and Saskatchewan, students whose parents attended a residential school are 8.4 percentage points less likely to graduate from high school themselves. Correcting for unobserved selection using the Oster (2019) methodology suggests that the residential school system lowered high school graduation rates among the children of those who attended by approximately 3 percentage points (unreported in the table).

Given that the nature of the residential school system, as well as who had control over the administration of the schools, changed over time, Table 4 also investigates whether the intergenerational effects of residential schools differ across decades. I estimate a separate specification for each decade of birth and perform this exercise separately for the full sample and for those living in the western provinces. In both samples, those born between 1960 and 1990 are driving the negative correlation between parental residential school attendance and high school graduation. Applying the Oster (2019) correction suggests that these effects are really being driven by one decade in particular—1970—and to a lesser extent, 1980 in the Western provinces. The bias-corrected estimates for these decades and suggest that in the Western provinces those born in the 1970s and 1980s to parents who attended a residential school are nearly 6 and 3 percentage points less likely to graduate themselves, respectively.

This result is not entirely surprising, given that the residential school system reached their peak in the mid- to late-forties and that by the end of the forties the phase-out of the residential school system had begun, with administration transferring hands from the churches to the federal government. It is likely that students born in the 70s and 80s had parents who attended residential schools during this peak time of system. Another potentially related factor, documented in a working paper version of Feir (2016b), is that there were more reported cases of abuse in later decades. If traumas can be transmitted intergenerationally and if parents who had children in the 70s and 80s were more likely to attend a highly abusive school, then this may be a possible reason for the differential findings across decades.¹⁷

¹⁷Whether trauma is inherited genetically—a process known as epigenetics—has been the subject of some debate in the literature. Economists usually attribute the persistence of shocks to socioeconomic explanations; however, a growing body of research has connected persistence in health shocks to epigenetic causes

4.2 High School Graduation: Mechanisms

The negative link between parental residential school attendance and children’s high school graduation is at odds with the existing literature on the intergenerational transmission of human capital (Black et al., 2005; Oreopoulos et al., 2006; Black and Devereux, 2010; Corak, 2013; Chetty et al., 2014). The experiences of those who attended the school may have resulted in a distrust in mainstream educational institutions and these attitudes may have persisted intergenerationally (Thibodeau and Peigan, 2007; Loppie et al., 2014; Feir, 2016a). Alternatively, removing children from their parents without providing strong role models for caregivers, may have led to subsequent issues in the home environment of children whose parents attended a residential school (Truth and Reconciliation Commission of Canada, 2015a; Partridge, 2010). This section attempts to gain an understanding of which, if either, of these explanations is more likely. Throughout the section I focus on the full sample rather than just those who reside in the western provinces.

4.2.1 Culture

Table 5 begins by using the 2001 APS to examine whether there is a different impact of parental residential school attendance for those living on- compared to off-reserve.¹⁸ Here we see that there is a clear difference in the relationship between parental residential school attendance and high school graduation for people who live on- versus off-reserve. The OLS estimates suggest that those who live on-reserve whose parents attended residential school are 3.2 percentage points more likely to graduate high school, while those living off-reserve whose parents attended residential school are 4.0 percentage points less likely to graduate high school. Applying the Oster (2019) correction suggests that the on-reserve impact is in the realm of 2.6 percentage points, while the off-reserve impact is closer to a null effect.¹⁹

Recall, the economic literature on the impact of residential schools on those who attended them find that residential schools increased the educational attainment of their attendees (Feir, 2016b; Gregg, 2017). Given the predictions generated by standard models of the intergenerational transmission of human capital, we should therefore expect the human capital of subsequent generations to be higher as well. The result that, on average, parental residential school attendance decreased the educational attainment of subsequent generations runs counter to the prevailing theory. Table 5 demonstrates that reserves may provide the conditions under which the prevailing theory may hold. The differential impact for those

(Heijmans et al., 2008; Costa et al., 2018; Costa, Yetter, and DeSomer, Costa et al.).

¹⁸The 2006 and 2012 APS waves only surveyed people off-reserve so are not included in this estimation.

¹⁹This finding is similar to Feir (2013) who examines the adult outcomes of the children of residential school survivors using the 2001 APS and finds little correlation between parental residential school attendance and high school graduation.

on- versus off-reserve is in line with the theory that residential schools led to a distrust in mainstream educational institutions if reserves provide a protective shield against the legacy of colonialism. The question then becomes, what is it about reserves that may act as a protective shield?

One way in which reserves may help to mitigate the harmful intergenerational effects of residential schooling is if the education or environment surrounding students on reserves allows them to be more in touch with their culture. This may occur directly through educational institutions or through community initiatives. If true, this would also suggest that interventions that promote Indigenous culture can be an important way to mitigate historical traumas. I investigate this possibility by compiling a separate dataset on historical residential school exposure, high school graduation today, and a measure of cultural interventions.

This supplementary dataset is constructed at the First Nation-level, so does not use restricted-access microdata from Statistics Canada. Instead, I measure high school graduation rates from the First Nations Community Profiles.²⁰ This yields a sample of 525 First Nations that meet Statistics Canada’s public reporting requirements for women and 528 for men. To measure residential school exposure, I follow the intuition in Feir (2016b) and Gregg (2017) and effectively re-construct a version of their instrumental variables to use directly in the estimating equation as proxies for community-level exposure to residential schools. I use the geodetic distance between the reserve centroid and the location of the closest residential school to construct the first proxy for residential school exposure. Since some First Nations span multiple reserves, I use the average distance to the closest residential school of all communities associated with each First Nation. For the second proxy, I also compile information on the share of Indigenous students in each province who attended residential school in 1945—the peak of the residential system—from the 1945 Indian Affairs Annual Report.

As a measure of cultural interventions I compile a list of cultural centers from the First Nations Confederacy of Cultural Education Centers,²¹ which I then match to First Nations through a number of secondary sources. This variable measures the extensive margin of having a cultural education center and does not take into account the intensity of cultural

²⁰Information on average educational attainment is from the First Nations Community Profiles at <https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/SearchFN.aspx?lang=eng>, which I scraped using the `rvest` package in R. To approximate high school graduation among adults, I summed over the number of individuals with a high school degree, trade school, university below the bachelor’s level, and university at or above the bachelor’s level and divide by the total population aged 15 and over. Since this denominator also includes people who may still be completing high school, I include a control for the median age of men and women in each nation.

²¹The list of centers can be found here: <http://fnccec.ca/>.

interventions provided by each center.

I begin by establishing the basic relationship between the proxies for residential school and high school graduation. Using this First Nation-level dataset, I estimate the following specification:

$$Y_{ip} = \alpha + \gamma d_{ip} + \phi s_i + \theta d_i \times s_p + \mathbf{X}_{ip}\boldsymbol{\beta} + \epsilon_{ip}, \quad (2)$$

where, Y_{ip} is now the high school graduation rate of First Nation i located in province p , d_{ip} is the average distance between First Nation i and the closest residential school, and s_p is the share of Indigenous students in province p who attended a residential school in 1945.²² Given the historical narrative, we would expect First Nations located farther from residential schools to have had lesser exposure to residential schools than those located closer to a residential school. We may further expect this relationship to be amplified in provinces where a smaller fraction of students attended residential school. In other words, in provinces where fewer students attended residential school, those in closest proximity to a residential school were most likely to attend, whereas in provinces where most Indigenous students attended a residential school, residential school attendance would be less determined by proximity to a school. Empirically, testing this hypothesis amounts to testing whether $\gamma > 0$ and $\theta < 0$.

As usual, \mathbf{X}_{ip} is a matrix of controls, which I chose based on factors that may have influenced historical residential schooling and contemporary human capital acquisition. These include the distance between a reserve and the closest historical trading post, the closest historical railway station, the ruggedness index of a nation’s ancestral territory and the ruggedness index of a nation’s reserve, as well as indicators for whether a nation was historically egalitarian, centralized, nomadic or semi-nomadic, whether they signed a historical treaty, and if so, whether that treaty had an education clause. These historical factors come from [Feir et al. \(2020\)](#).²³ I also control for the median age of men and women in my sample of reserves and an indicator for whether population data for that reserve was missing from the First Nations Community Profiles.

The results of equation 2 are located in Table 6. The first 3 columns establish the basic fact that First Nations located farther from residential schools have higher graduation rates and that the relationship between distance to a residential school and high school graduation is smaller for those living in provinces where a high fraction of students attended a residential school historically. Column (1) presents these results for the full sample, column (2) reports

²²Since some First Nations span multiple communities, I compute the geodetic distance between each community and the closest residential school and then average this value over each community associated with a given First Nation.

²³The original sources for these controls are described in the Appendix.

the results for men only, and column (3) reports the results for women.

The first three columns of Table 6 verify that the proxies for residential school exposure have the expected relationship with high school graduation; however, the purpose of Table 6 is to understand whether culture may provide a buffer against any of the harmful impacts of historical residential school exposure. To test this, I interact each of the proxies for residential school exposure with the measure of culture described above. Specifically:

$$Y_{ip} = \alpha + \gamma d_{ip} + \phi s_i + \theta d_i \times s_p + \omega d_{ip} \times c_{ip} + \psi s_i \times c_{ip} + \zeta d_i \times s_p \times c_{ip} + \mathbf{X}_{ip}\boldsymbol{\beta} + \epsilon_{ip} \quad (3)$$

In the absence of a proxy for culture, the first three columns of Table 6 showed that the relationship between distance to a residential school and contemporary high school graduation is positive and that this relationship is dampened in provinces where a large share of the population was sent to residential school. That is, we found $\hat{\gamma} > 0$ and $\hat{\theta} < 0$. If culture is able to mitigate this relationship, we would expect the interactions of culture and these variables to be the opposite sign. In the context of equation 3, this would mean that, in addition to finding $\hat{\gamma} > 0$ and $\hat{\theta} < 0$ we should see $\hat{\omega} < 0$ and $\hat{\zeta} > 0$.

The results of estimating equation 3 are reported in columns (4) through (6) of Table 6, for the full sample, and separately for men and women. The final row of Table 6 takes into account all of the interactions between the presence of a cultural centre and the residential school proxies and reports the marginal impact of culture evaluated at the mean values of all variables. The first thing to note is that the coefficients on each of the residential school proxies interacted with the presence of a cultural centre are, indeed, of opposite sign from the non-interacted proxies, suggesting that culture does have the potential to mitigate the relationship between historical residential school exposure and contemporary educational attainment. The second noteworthy observation in Table 6 is that the marginal impact of having access to a cultural centre is non-trivial. Evaluated at the mean of all residential school proxies and control variables, a First Nation with access to a cultural centre has a high school graduation rate that is about 3 percentage points higher than one without a cultural centre. The mean high school graduation rate in my sample is 54%, so an increase of 3 percentage points is a sizeable change in the high school graduation rate.

Altogether, the results of this section suggest that cultural interventions have a potentially important role for mitigating historical traumas. While these results do not rule out the alternative explanation for the intergenerational impacts of residential schools—namely, that the lack of family structure and role models at the schools changed the investments made by residential school survivors in their own children—they provide insight into a tractable way in which policy may be able to address disparities in educational attainment among Indigenous and non-Indigenous students in Canada.

4.2.2 Role Models

The alternative narrative for why there may be a lasting impact of residential schools on subsequent generations is that residential schooling resulted in generations of adults who had not been exposed to parental role models as children. If this narrative is true, then we may expect to see a higher number of individuals who attended residential school themselves who have no, or low, expectations regarding their own children’s educational attainment. The 2012 APS contains a set of questions regarding parents hopes or aspirations for their children’s educational attainment. Since the 2012 APS also contains questions on people’s own experiences with residential schools, I can examine whether parents who attended residential schools themselves have different expectations regarding their children’s educational outcomes compared to parents who did not attend a residential school. To do so, I restrict the sample to include only the 2012 APS and to include only individuals who have children and then estimate OLS regressions of the form:

$$\text{aspiration}_{irt} = \alpha + \gamma \text{RS-parent}_{irt} + \mathbf{X}_{irt}\boldsymbol{\beta} + \psi_r + \zeta_t + \epsilon_{irt}, \quad (4)$$

where the dependent variable aspiration_{irt} is now an indicator for whether the parent listed a particular level of education as an aspiration for their child’s educational attainment. The outcomes I study are whether the parent has no aspirations for their child’s education, “None”, or whether they respond with high school, a trade, college, university, more than high school, or a post-secondary degree to the question, “*How far do you hope that [your child] will go in school?*” The right hand side of equation 5 is identical to equation 1.

Table 7 presents the results of estimating equation 4. I find no systematic correlation between parents’ residential school experiences and future aspirations for their children’s educational attainment. None of the coefficients are statistically different from 0. The coefficient that is largest in magnitude is that on whether a parent hopes their child will obtain a university degree, which suggests that parents who attended a residential school are 4.2 percentage points more likely to list this as an aspiration compared to those who did not attend a residential school. While the estimate is statistically insignificant, the Oster correction suggests an even larger magnitude of a roughly 7 percentage point difference. If anything, these results are at odds with the possibility that residential schools led parents to hold lower aspirations for their own children’s educational attainment.

The final exercise I implement to shed light on the potential mechanisms behind the negative correlation between children’s educational attainment and their parent’s attendance at residential school is to look at the reasons why those who chose to leave high school made

that decision. I estimate the following specification:

$$\text{reason}_{irt} = \alpha + \gamma \text{RS_parent}_{irt} + \mathbf{X}_{irt} \boldsymbol{\beta} + \psi_r + \zeta_t + \epsilon_{irt}, \quad (5)$$

where the dependent variable reason_{irt} is an indicator for whether the individual listed a particular explanation as a reason for why they left high school, and the controls are the same as equations 1 and 4. For these specifications, I pool the 2001 and 2006 APS for each explanation. However, I exclude 2012 due to the fact that, while there was some overlap in the reasons for leaving that were listed, they were not consistent across survey waves and were particularly different for the 2012 survey. I also restrict the sample to include only individuals who did not complete high school. Figure 5 presents the results of this exercise, where each red circle represents the coefficient estimate on RS_{parent} for a separate regression. The Oster (2019) corrected coefficients are represented by red triangles. Dotted lines represent 90% confidence intervals.

There are several reasons students chose to leave high school that are more commonly reported by students whose parents attended a residential school. For instance, the children of residential school attendees are more likely to leave high school due to issues with alcohol and drugs, they are more likely to have been expelled, and are more likely to report leaving due to problems at home, having to engage in child care,²⁴ or having to work. Students whose parents attended a residential school are statistically less likely to report that they left school over health reasons,²⁵ and are less likely to refuse to provide an answer to the question. They are also less likely to report that they left high school because they had wanted to work, but the sign on this estimate flips once the Oster (2019) correction is taken into account. The remainder of the reasons produced estimates that were not statistically different from zero.

The analysis of the reasons why students chose to leave high school does not strongly favour one explanation over the other as to why we observe a negative correlation between parental residential school attendance and educational outcomes of subsequent generations. Some of the reasons that were found to be statistically different between the children of residential school attendees and those whose parents did not attend a residential school—having to work and involvement in childcare—are consistent with the possibility that they faced additional hardships at home, possibly due to a lack of support from their own parents. This explanation fits with the “role model” narrative wherein residential schools left generations

²⁴It should be noted that this includes both individuals who must take care of their own children and individuals who had to take care of siblings or relatives’ children.

²⁵It is not clear whether these are due to physical health problems or mental health problems like addiction, depression, etcetera.

of individuals without the proper parenting and family skills that are typically developed from observing ones own family and home environment. However, students whose parents attended a residential school were less likely to report that they left as a result of poor health, whereas one might expect the reverse if there was a lack of parental role models among this population. Other statistical differences, like the abuse of alcohol or drugs, and a higher likelihood of being expelled from school, could be consistent with either mechanism.

4.3 Additional Adult Outcomes

I now turn to an analysis of some of the other factors that may have been impacted by the intergenerational legacy of residential schools. These include additional measures of human capital and employment, subjective measures of health, and reported involvement in traditional activities. An important consideration to keep in mind while interpreting the impact of parental residential schooling on these outcomes is that they may either be consequences of the same channel through which high school graduation was impacted or they may be a product of reduced human capital acquisition, which in turn can affect other outcomes.

4.3.1 Human Capital Attainment

Table 8 displays the parental residential school effect for a set of other education outcomes as well as an employment indicator. Each of the education variables refers to the highest level of schooling reported by the individual. There is virtually no impact of parental residential schooling on any of the additional human capital variables. The only exception is that the children of residential school attendees are 1.5 percentage points more likely to report having some post-secondary as their highest level of schooling. Although this estimate is only marginally statistically significant, it increases in magnitude to 4.1 percentage points once the Oster (2019) correction is applied.

Given the robust negative relationship between high school graduation and parental residential school attendance, it may seem surprising that there is little to no impact on post-secondary attainment; however, it may simply be that post-secondary is not the relevant margin in this situation. In other words, those who are on the margin of dropping out of high school are not the same students who are attending post-secondary institutions.

Column (5) shows the estimate of the impact of parental residential school attendance on employment. Adult children whose parents attended a residential school are 3.0 percentage points less likely to be employed than those whose parents did not attend a residential school in the full sample, and 3.02 in the sample from western provinces. Applying the Oster (2019) correction reveals a 1.6 percentage point lower likelihood of employment for children

of residential school attendees in the full sample, and a 0.2 percentage point lower likelihood of employment for the sample of students in western provinces. The lower incidence of employment among the children of residential school survivors is likely a result of high school graduation rates being affected, as there were no discernible negative impacts on other levels of educational attainment.

4.3.2 Health and Health Behaviours

The health effects associated with education are typically large, with some studies finding a causal link between high school graduation and health outcomes (Heckman et al., 2017a,b). As such, if residential schooling led to a decline in the educational attainment of subsequent generations, we might expect to see worse health outcomes among those whose parents attended a residential school. However, Auld and Feir (2020) show that residential schooling led to increases in height and body weight for status First Nations born after the 1960s. Since maternal health is known to be related to child health, the results in Auld and Feir (2020) would suggest that parents who attended residential schools may have better health outcomes. Which of these two effects dominates is therefore an empirical question.

Table 9 investigates this question by looking at the likelihood that an individual drinks heavily, smokes daily, reports being in excellent health, reports being in poor health, or has been diagnosed with diabetes.²⁶ In line with the literature linking educational attainment to better health, the results suggest that individuals whose parents attended a residential school are more likely to smoke, less likely to report being in excellent health, more likely to have been diagnosed with diabetes, and are marginally more likely to report being in poor health. These results hold even after applying the methodology of Oster (2019).

4.3.3 Participation in Traditional Activities

One of the goals of residential schools was to effectively break the link between Indigenous children and their Indigenous identity and culture. In accordance with this goal, scholars have found that the schools led to a decline in traditional activities (Feir, 2016b; Gregg, 2017), which we may expect to persist intergenerationally (Fernandez, 2013; Tam, 2015; Nunn, 2012). On the other hand, if traditional livelihood activities are at odds with the western conventional economic systems, then lower levels of high school graduation rates among Indigenous youth whose parents attended a residential school may actually be accompanied by higher involvement in traditional activities.

²⁶Drinking heavily is defined as 5 or more drinks between 2 and 7 times per week. Self reported health categories range from excellent, very good, good, fair, and poor. Thus, the coefficient on parental residential schooling in the “Excellent” regression is not the inverse of the coefficient on parental residential schooling in the “Poor” regression. Diabetes is defined as 1 if an individual reports having ever been diagnosed with diabetes by a healthcare professional.

Table 10 shows children whose parents attended a residential school are more likely to engage in traditional activities, like hunting, fishing, trapping, and gathering, as adults. This finding is in line with the latter two theories connecting the residential school experience to later generations, but does not favour one possibility over the other. The coefficient on parental residential schooling in the regression of the likelihood of speaking an Aboriginal language provides some insight into which conjecture may be more accurate. After accounting for selection using the Oster (2019) methodology, students whose parents attended a residential school are less likely to speak an Aboriginal language themselves. If low levels of high school graduation was the reason behind an increase in traditional livelihood activities like hunting and gathering, it is paradoxical to find a decline in the likelihood of speaking an Aboriginal language. The more plausible explanation is that healing initiatives that incorporate traditional ways of life were successful in reviving some of the cultural practices among Indigenous groups.

5 Conclusion

It is well established that colonial policies have generally been unkind to Indigenous communities in North America with implications that have lasted for generations (Dippel, 2014; Russ and Stratmann, 2014; Leonard et al., 2020; Feir et al., 2019, 2020). Today, Indigenous people in both Canada and the United States have lower levels of educational attainment than all other population groups (Wilson and Macdonald, 2010; National Center for Education Statistics, 2017; Statistics Canada, 2017). Not surprisingly, this translates into lower levels of employment and other related outcomes. In this paper, I explore the colonial origins of these socioeconomic disparities and, in doing so, uncover a puzzle related to the intergenerational transmission of human capital in the context of Indigenous peoples in Canada.

The residential school system was a policy of forcible assimilation that was used by governments in the United States, Canada, New Zealand, Australia, and Greenland, to subjugate the Indigenous populations of the lands. Recent work in the economics literature examining residential schools in Canada and the United States has shown that the policy was largely successful in economically and culturally assimilating Indigenous populations, in that those who attended them had better educational, health, and employment outcomes, but that this was at the expense of Indigenous cultural practices (Gregg, 2017; Feir and Hancock, 2016; Auld and Feir, 2020). Given that the literature on the intergenerational transmission of human capital suggests that parents who are more educated tend to have children who are more educated (Black et al., 2005; Oreopoulos et al., 2006; Page, 2006; Black and Devereux, 2010), we would expect children of residential school survivors to have

higher levels of educational attainment compared to those whose parents did not attend a residential school. However, OLS estimates of the relationship between parental residential school attendance and children’s educational outcomes, adjusted to account for selection using the method of [Oster \(2019\)](#), reveal that this is not the case. These results are consistent with existing empirical and qualitative work that has studied the intergenerational legacy of Indian residential schools ([Ing, 1990](#); [Bombay et al., 2013](#); [Feir, 2016a](#)).

The most common explanations put forth for the negative correlation between parental residential school attendance and children’s outcomes are twofold. On the one hand, removing children from their own families and placing them in live-in institutions without strong role models for parents may have led to generations of children who, as adults, had not learned family skills that are typically developed from observing one’s own family ([Evans-Campbell, 2008](#); [Bombay et al., 2011](#); [Truth and Reconciliation Commission of Canada, 2015a](#)). On the other hand, the deprival of Indigenous culture at the hands of those in charge of these institutions may have created a sense of distrust in mainstream educational institutions that has persisted across generations ([Thibodeau and Peigan, 2007](#); [Bombay et al., 2013](#); [Loppie et al., 2014](#); [Feir, 2016b](#)). I present evidence that is consistent with both narratives, suggesting that solutions put forth to reduce educational disparities between Indigenous and non-Indigenous peoples will need to be mindful of all of the potential channels through which the effects of residential schools may persist intergenerationally. That being said, I provide empirical evidence that access to Indigenous cultural centers has the potential to mitigate the negative impacts of the residential school system, thereby suggesting a way in which governments can strategically invest in programs to reduce these gaps.

The concept of Indigenous resilience has often been overlooked when it comes to discussion of historical trauma ([Hatala et al., 2016](#)). In the psychological literature, the construct of resilience has migrated from one referring to an individual trait, wherein someone was perceived as resilient if they were, “*doing well despite adversity*” ([Luthar and Cicchetti, 2000](#)), towards a broader concept—one in which resilience incorporates individual, social, political, and cultural dimensions of adjustment ([Masten, 2001](#)). In this sense, my results speak to the concept of Indigenous resilience through this multi-dimensional lens and provide quantitative evidence on the role of culture in facilitating resilience and overcoming trauma. In relation to the broader economics literature, this paper emphasizes the importance of fostering culture and identity in educational institutions, in line with earlier work by [Akerlof and Kranton \(2002\)](#). This is particularly important for traditionally marginalized populations, who, due to historical policies or events, may have been underserved when it comes to education—both in terms of access to and quality of education—and who, as a result, may not feel their identities align with mainstream educational institutions.

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A Figures

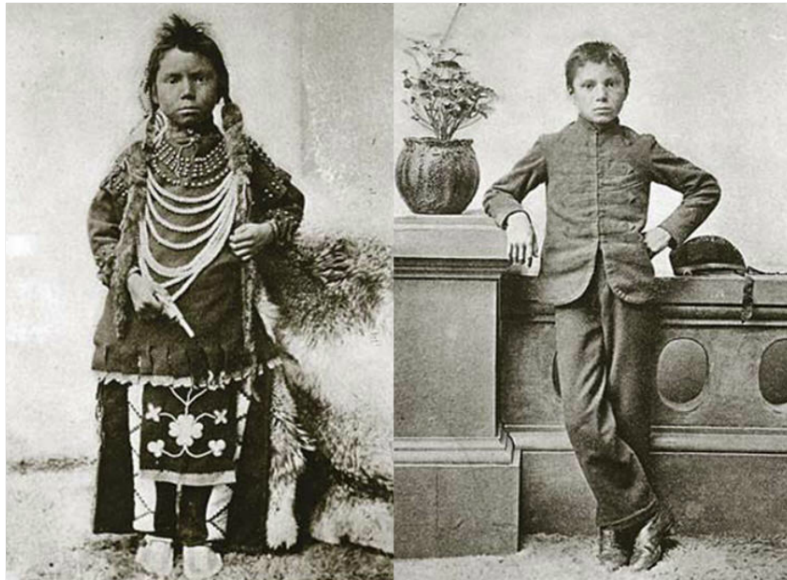
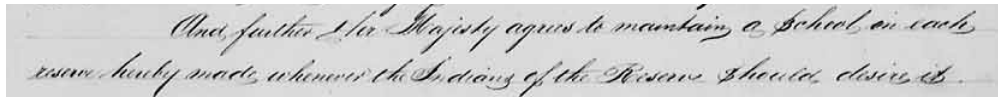
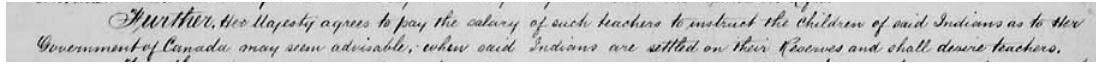


Figure 1: Thomas Moore “before and after tuition”. Retrieved from the Department of Indian Affairs Annual Report of 1904.



And, further Her Majesty agrees to maintain a School in each reserve hereby made whenever the Indians of the Reserve should desire it.

(a) The education clause contained in Treaty 1, which was signed between the Queen and the Chippewa and Cree Indians of Manitoba and adjacent country in 1871.



Further, Her Majesty agrees to pay the salary of such teachers to instruct the children of said Indians as to Her Government of Canada may seem advisable, when said Indians are settled on their Reserves and shall desire teachers.

(b) The education clause contained in Treaty 7, which was signed between the Queen and Blackfoot (and other) tribes in 1877. Retrieved from Library and Archives Canada microfilm T-9939.

Figure 2: Examples of the education clauses contained in Treaty 1 and Treaty 7. Retrieved from Library and Archives Canada microfilm T-9940.

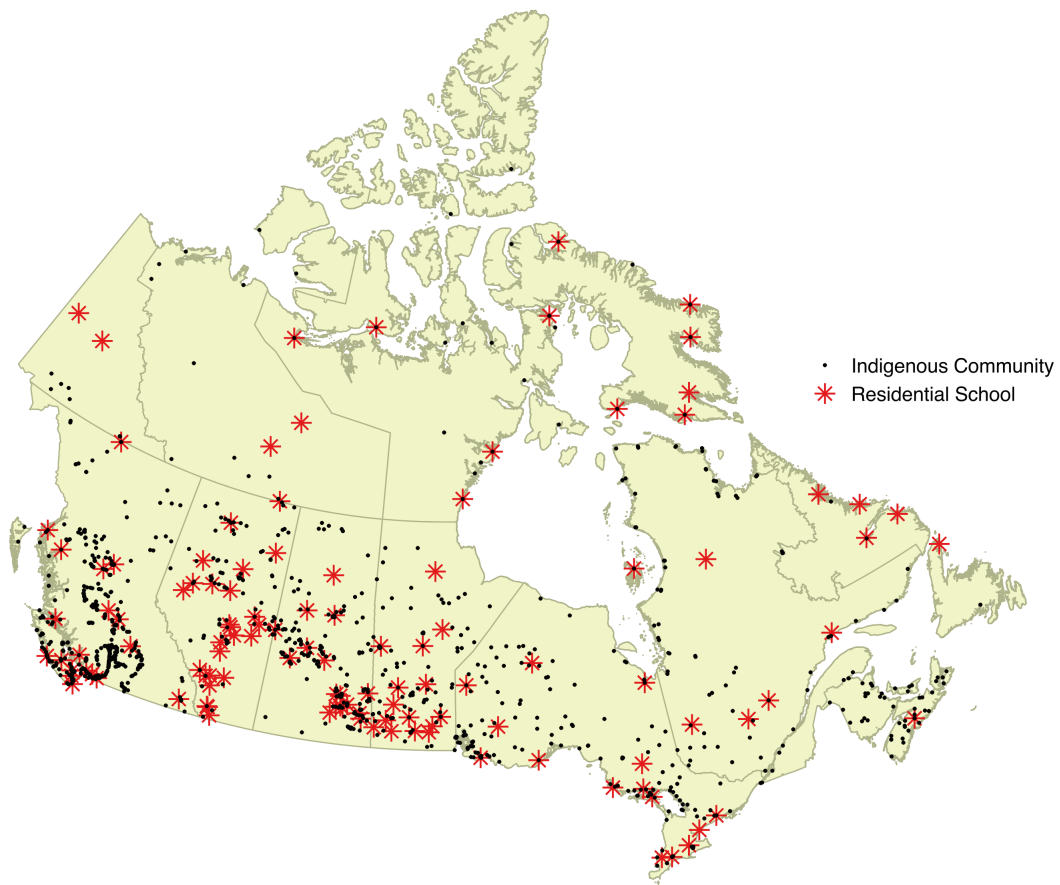


Figure 3: Location of residential schools and Indigenous communities in Canada. Locations were compiled from the Aboriginal Healing Foundation (AHF), supplemented with records from the Anglican Church of Canada, and court documents from the Newfoundland and Labrador Lawsuit Against Residential Schools.

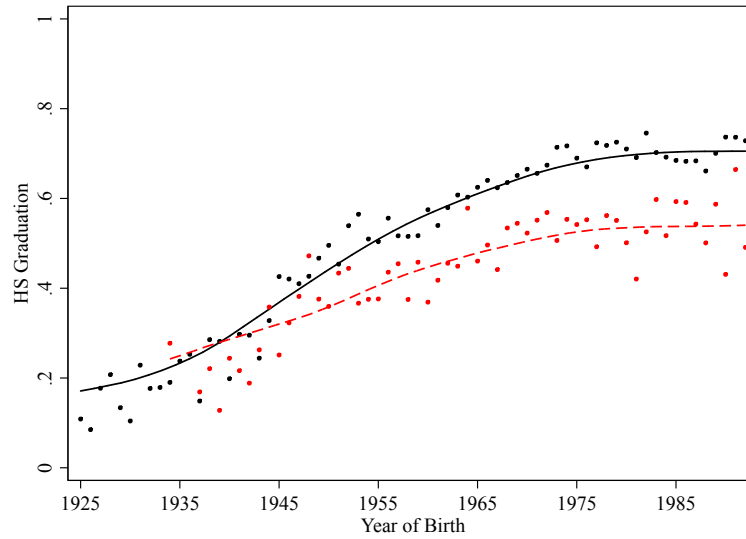


Figure 4: The evolution of high school graduation rates among Indigenous students between 1925 and 1995. The curves show the graduation rates of students who have at least one parent who was a student at a federal residential school (dashed red) and students who either do not know if their parents attended residential school or know that neither parent attended residential school (solid black). Data used to construct the plot are from the 2001, 2006 and 2012 waves of the Aboriginal People's Surveys.

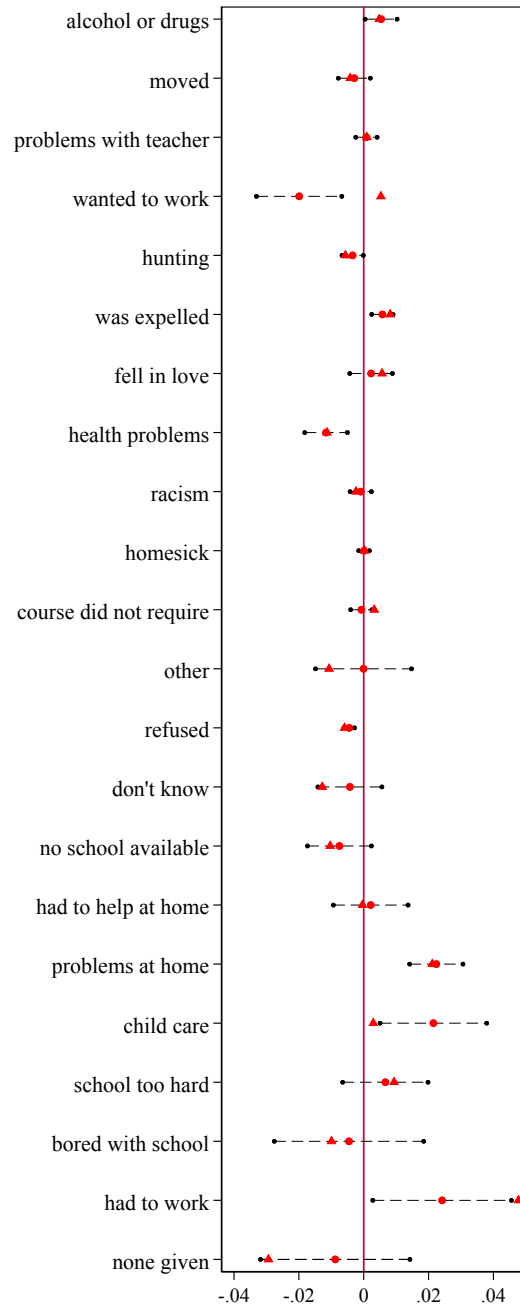


Figure 5: Estimates of the reasons for leaving high school. Coefficient estimates and 90% confidence intervals for regressions of the reason for leaving high school on an indicator for whether or not a parent attended a residential school. Red circles indicate coefficient estimates, while red triangles indicate the [Oster \(2019\)](#).

B Tables

Table 1: Descriptive statistics

	Know History			Western Provinces		
	Parent RS	No Parent RS	Diff	Parent RS	No Parent RS	Diff
<i>A: Covariates</i>						
Attended RS	0.209 (0.006)	0.032 (0.001)	0.177*** (0.006)	0.213 (0.007)	0.026 (0.001)	0.187*** (0.007)
Status Indian	0.696 (0.008)	0.231 (0.003)	0.464*** (0.008)	0.755 (0.008)	0.240 (0.004)	0.515*** (0.009)
First Nation	0.730 (0.007)	0.341 (0.004)	0.390*** (0.008)	0.785 (0.007)	0.351 (0.005)	0.434*** (0.009)
Métis	0.193 (0.006)	0.378 (0.004)	-0.184*** (0.007)	0.203 (0.007)	0.442 (0.005)	-0.238*** (0.009)
Inuit	0.052 (0.002)	0.028 (0.001)	0.024*** (0.002)	0.008 (0.001)	0.006 (0.000)	0.003** (0.001)
Male	0.425 (0.008)	0.454 (0.004)	-0.029*** (0.009)	0.417 (0.009)	0.454 (0.005)	-0.037*** (0.010)
On-Reserve	0.077 (0.002)	0.013 (0.000)	0.064*** (0.002)	0.084 (0.002)	0.014 (0.000)	0.070*** (0.002)
Closest RS	67.544 (1.412)	103.601 (0.879)	-36.057** (1.664)	44.104 (1.003)	58.029 (0.648)	-13.925*** (1.195)
Birth Year	1965 (0.223)	1964 (0.114)	1.004*** (0.250)	1965 (0.247)	1965 (0.135)	0.012 (0.281)
<i>B: Education Outcomes</i>						
High School	0.440 (0.008)	0.607 (0.004)	-0.168*** (0.009)	0.430 (0.009)	0.616 (0.005)	-0.185*** (0.010)
Trade	0.104 (0.005)	0.110 (0.003)	-0.006*** (0.005)	0.096 (0.005)	0.107 (0.003)	-0.010* (0.006)
College	0.198 (0.007)	0.228 (0.004)	-0.029*** (0.007)	0.197 (0.007)	0.230 (0.004)	-0.032*** (0.009)
Bachelor	0.085 (0.004)	0.113 (0.003)	-0.028*** (0.005)	0.084 (0.005)	0.105 (0.003)	-0.021*** (0.006)
Some PS	0.581 (0.008)	0.620 (0.004)	-0.040*** (0.009)	0.578 (0.009)	0.622 (0.005)	-0.044*** (0.010)
<i>C: Other Outcomes</i>						
Employed	0.644 (0.007)	0.704 (0.004)	-0.060*** (0.008)	0.638 (0.008)	0.723 (0.004)	-0.085*** (0.009)
Drinks Heavily	0.037 (0.003)	0.032 (0.001)	0.005** (0.003)	0.035 (0.003)	0.034 (0.002)	0.000*** (0.003)
Smokes	0.387 (0.008)	0.307 (0.004)	0.081*** (0.008)	0.377 (0.008)	0.304 (0.004)	0.073*** (0.010)
Excellent Health	0.184 (0.006)	0.226 (0.003)	-0.042*** (0.007)	0.179 (0.006)	0.219 (0.004)	-0.041*** (0.007)
Poor Health	0.073 (0.005)	0.054 (0.002)	0.019*** (0.005)	0.077 (0.006)	0.055 (0.002)	0.022*** (0.006)
Diabetes	0.105 (0.005)	0.073 (0.002)	0.031*** (0.005)	0.113 (0.006)	0.075 (0.003)	0.038*** (0.006)
AB Lang	0.519 (0.008)	0.167 (0.003)	0.353*** (0.008)	0.524 (0.009)	0.176 (0.003)	0.349*** (0.009)
Hunt/Trap/Fish	0.401 (0.008)	0.369 (0.004)	0.032*** (0.008)	0.360 (0.008)	0.359 (0.005)	0.001*** (0.009)
Gathering	0.370 (0.007)	0.285 (0.004)	0.085*** (0.008)	0.352 (0.008)	0.267 (0.004)	0.086*** (0.009)

Notes: this table shows sample means from the pooled 2001, 2006, 2012 Aboriginal Peoples Surveys weighted by the survey weights. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Effect of parent's residential schooling on child's probability of graduating high school (full sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parent RS	-0.165*** (0.019)	-0.175*** (0.015)	-0.113*** (0.019)	-0.115*** (0.019)	-0.0857*** (0.017)	-0.0685*** (0.018)	-0.0647*** (0.018)
Gender				-0.0573*** (0.007)	-0.0573*** (0.007)	-0.0587*** (0.007)	-0.0590*** (0.007)
First Nation					-0.122*** (0.008)	-0.0884*** (0.008)	-0.0880*** (0.008)
Métis					-0.0615*** (0.008)	-0.0605*** (0.009)	-0.0609*** (0.009)
Inuit					-0.120*** (0.026)	-0.118*** (0.026)	-0.115*** (0.027)
Status						-0.0733*** (0.017)	-0.0715*** (0.017)
Own RS							-0.0362* (0.018)
Constant	0.577*** (0.024)	0.222*** (0.062)	0.228* (0.117)	0.259** (0.113)	0.340*** (0.109)	0.348*** (0.105)	0.346*** (0.106)
birth year f.e.		X	X	X	X	X	X
csd f.e.			X	X	X	X	X
Observations	70460	70460	70460	70460	70460	70460	70460
Adj. R^2			0.198	0.201	0.208	0.211	0.211
R^2	0.0185	0.0968					

Notes: Dependent variable is 1 if individual has a high school degree. Standard errors, clustered by province, are reported in parentheses. Census wave fixed effects are included in each regression. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Effect of parent's residential schooling on child's probability of graduating high school (western provinces)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parent RS	-0.184*** (0.016)	-0.187*** (0.015)	-0.137*** (0.006)	-0.139*** (0.006)	-0.106*** (0.008)	-0.0879*** (0.013)	-0.0837*** (0.012)
Gender				-0.0544*** (0.006)	-0.0546*** (0.006)	-0.0561*** (0.007)	-0.0564*** (0.007)
First Nation					-0.127*** (0.013)	-0.0935*** (0.007)	-0.0930*** (0.008)
Métis					-0.0695*** (0.011)	-0.0702*** (0.013)	-0.0706*** (0.013)
Inuit					-0.117* (0.044)	-0.112* (0.043)	-0.109* (0.043)
Status						-0.0723** (0.024)	-0.0707** (0.025)
Own RS							-0.0340 (0.020)
Constant	0.584*** (0.032)	0.216* (0.079)	0.201 (0.153)	0.235 (0.150)	0.322* (0.142)	0.336* (0.141)	0.335* (0.142)
birth year f.e.		X	X	X	X	X	X
csd f.e.			X	X	X	X	X
Observations	47190	47190	47190	47190	47190	47190	47190
Adj. R^2			0.168	0.171	0.178	0.181	0.181
R^2	0.0238	0.101					

Notes: Dependent variable is 1 if individual has a high school degree. Standard errors, clustered by province, are reported in parentheses. Census wave fixed effects are included in each regression. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Effect of parent's residential schooling on child's probability of graduating high school by decade of birth

	1920s	1930s	1940s	1950s	1960s	1970s	1980s
Panel A: Full Sample							
Parent RS	-0.0583	-0.0215	0.0250	-0.0340	-0.0637**	-0.0968***	-0.0787**
Oster Correction	[-0.07628]	[0.02043]	[0.08822]	[0.02974]	[0.00924]	[-0.02428]	[0.00357]
	(0.080)	(0.061)	(0.034)	(0.032)	(0.021)	(0.025)	(0.033)
Observations	1100	3430	7580	13520	17390	17380	8690
Adj. R^2	0.537	0.352	0.291	0.216	0.213	0.189	0.154
Panel B: Western Provinces							
Parent RS	-0.0742	-0.0400	0.0121	-0.0533	-0.0744**	-0.127***	-0.0906*
Oster Correction	[-0.13917]	[0.01685]	[0.06564]	[0.01900]	[0.00337]	[-0.05644]	[-0.02753]
	(0.082)	(0.078)	(0.042)	(0.030)	(0.021)	(0.022)	(0.039)
Observations	760	2360	5020	8950	11810	11830	5550
Adj. R^2	0.426	0.358	0.252	0.194	0.162	0.144	0.103

Notes: Dependent variable is 1 if individual has a high school degree. Standard errors, clustered by province are reported in parentheses. All specifications include the full set of controls, as well as census wave, year of birth, and census subdivision fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effect of parent's residential schooling on child's probability of graduating high school for those living on- versus off- reserve (2001 sample)

	On-Reserve	Off-Reserve
Parent RS	0.0317***	-0.0397
Oster Correction	[0.02578] (0.029)	[0.00061] (0.009)
Observations	9960	28580
Adj. R^2	0.113	0.269

Notes: Dependent variable is 1 if individual has a high school degree. Standard errors, clustered by province are reported in parentheses. Census wave fixed effects, year of birth fixed effects, census subdivision fixed effects, and geographic controls are included in each regression. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Historical Impact of Residential Schools

	Full (1)	Men (2)	Women (3)	Full (4)	Men (5)	Women (6)
Closest RS (in 100 KM)	0.0325* (0.015)	0.0463** (0.017)	0.0181 (0.015)	0.0461** (0.017)	0.0628** (0.022)	0.0285 (0.020)
Closest RS \times Culture				-0.0454 (0.031)	-0.0530 (0.031)	-0.0343 (0.037)
RS Share	0.0946 (0.053)	0.0889** (0.039)	0.0821 (0.075)	0.121* (0.060)	0.118** (0.044)	0.102 (0.088)
RS Share \times Culture				-0.129* (0.068)	-0.135** (0.055)	-0.108 (0.095)
Closest RS \times RS Share	-0.118*** (0.032)	-0.138*** (0.036)	-0.101** (0.035)	-0.144*** (0.034)	-0.168*** (0.036)	-0.124** (0.044)
Closest RS \times RS Share \times Culture				0.142** (0.061)	0.148** (0.051)	0.149* (0.080)
Cultural Centre (Culture)				-0.129* (0.068)	-0.135** (0.055)	-0.108 (0.095)
Marginal Impact of Culture at the Mean				0.031** (0.013)	0.029 (0.017)	0.035** (0.013)
N. Observations	525	528	525	525	528	525
Adjusted R^2	0.433	0.349	0.334	0.438	0.353	0.337

Notes: Standard errors, clustered by province are reported in parentheses. All columns include controls for the median age of men and women, indicators for whether population data is missing, distance to the closest historical trading post, distance to the closest historical railway station, ruggedness on reserves, ruggedness in traditional territories, an indicator for whether a nation was historical egalitarian, an indicator for whether a nation was historically centralized, an indicator for whether a nation was historically semi-nomadic, whether the nation had signed a historic treaty, and if they had signed a treaty, whether it included an education clause. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Effect of parent's residential schooling on aspirations for child's educational attainment (full sample)

	None	High School	Trades	College	University	> High School	Post Secondary
Own RS	0.00484	-0.0219	-0.00797	-0.00527	0.0416	-0.0202	0.00825
Oster Correction	[0.00743] (0.006)	[-0.05138] (0.031)	[-0.00791] (0.009)	[-0.01199] (0.026)	[0.06960] (0.042)	[-0.01074] (0.029)	[0.03881] (0.035)
Observations	8520	8520	8520	8520	8520	8520	8520
Adj. R^2	0.0582	0.159	0.196	0.151	0.172	0.0859	0.168

Notes: Standard errors, clustered by province are reported in parentheses. All columns include the full set of controls, as well as census wave, year of birth, and census subdivision fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Effect of parent's residential schooling on human capital outcomes

	Trades (1)	College (2)	Bachelor's (3)	Some PS (4)	Employed (5)
Panel A: Full Sample					
Parent RS	-0.000941	-0.00513	-0.00815	0.0149*	-0.0303***
Oster Correction	[0.00164] (0.008)	[0.00625] (0.009)	[0.00139] (0.005)	[0.04086] (0.008)	[-0.01609] (0.008)
Observations	70450	70450	70450	70450	70450
Adj. R^2	0.0882	0.0920	0.0918	0.133	0.228
Panel B: Western Provinces					
Parent RS	-0.00568	-0.0124	-0.00707	0.0106	-0.0302**
Oster Correction	[-0.00343] (0.007)	[-0.00236] (0.010)	[-0.00009] (0.007)	[0.03796] (0.010)	[-0.00206] (0.011)
Observations	47180	47180	47180	47180	47180
Adj. R^2	0.0726	0.0799	0.0657	0.108	0.206

Notes: Standard errors, clustered by province are reported in parentheses. All specifications include the full set of controls, as well as census wave, year of birth, and census subdivision fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Effect of parent's residential schooling on health outcomes

	Drink (1)	Smoke (2)	Excellent Health (3)	Poor Health (4)	Diabetes (5)
Panel A: Full Sample					
Parent RS	0.00172	0.0480***	-0.0232***	0.0142**	0.0191***
Oster Correction	[-0.00004] (0.004)	[0.03238] (0.008)	[-0.01424] (0.005)	[0.01181] (0.006)	[0.01320] (0.006)
Observations	70450	70450	70450	70450	70450
Adj. R^2	0.0530	0.0955	0.0899	0.0932	0.129
Panel B: Western Provinces					
Parent RS	-0.000306	0.0486***	-0.0214**	0.0114	0.0197*
Oster Correction	[-0.00069] (0.005)	[0.03579] (0.009)	[-0.01142] (0.007)	[0.00616] (0.007)	[0.01004] (0.008)
Observations	47180	47180	47180	47180	47180
Adj. R^2	0.0483	0.0715	0.0689	0.0804	0.127

Notes: Standard errors, clustered by province are reported in parentheses. All specifications include the full set of controls, as well as census wave, year of birth, and census subdivision fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Effect of parent's residential schooling on traditional activities

	Aboriginal Language	Hunt/Trap/Fish	Gathering
Panel A: Full Sample			
Parent RS	0.115***	0.0296***	0.0751***
Oster Correction	[-0.00869] (0.014)	[0.02831] (0.006)	[0.07027] (0.004)
Observations	70450	70450	70450
Adj. R^2	0.394	0.203	0.131
Panel B: Western Provinces			
Parent RS	0.116***	0.0279***	0.0780***
Oster Correction	[-0.01518] (0.017)	[0.04148] (0.005)	[0.07371] (0.004)
Observations	47180	47180	47180
Adj. R^2	0.333	0.171	0.103

Notes: Dependent variable is 1 if individual has a high school degree. Standard errors, clustered by province are reported in parentheses. Census wave fixed effects are included in each regression. Geographic controls include a second order polynomial in latitude and longitude of census subdivision. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

C Bivariate Probit Sensitivity Analysis

Consider the following bivariate probit model that relates the student’s outcome, high school graduation (HS_{irt}) to parental residential schooling and other observables

$$RS_parent_{irt} = \mathbf{1}(RS_parent_{irt}^* > 0) \quad (6)$$

$$HS_{irt} = \mathbf{1}(HS_{irt}^* > 0), \quad (7)$$

where equation 6 determines whether a parent of individual i in region r born in year t attended a residential school, and equation 7 determines whether this individual completed high school. The unobserved latent variables $RS_parent_{irt}^*$ and HS_{irt}^* can be expressed as

$$RS_parent_{irt}^* = \alpha_p + \mathbf{X}_{irt}\boldsymbol{\beta}_p + \psi_r + \zeta_t + \epsilon_{irt} \quad (8)$$

$$HS_{irt}^* = \alpha_c + \gamma_c RS_parent_{irt} + \mathbf{X}_{irt}\boldsymbol{\beta}_c + \psi_r + \zeta_t + u_{irt} \quad (9)$$

$$\begin{bmatrix} \epsilon_{irt} \\ u_{irt} \end{bmatrix} \sim \mathcal{N}\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix}\right), \quad (10)$$

where \mathbf{X}_{irt} is a matrix of controls, ψ_r and ζ_t are region and time dummies. Without including an exclusion restriction the correlation between the error components of equation 8 and 9 will be non-zero. As a result, estimating equation 7 using univariate probit would lead to biased coefficient estimates of the effect of parental residential schooling on children’s outcomes.²⁷ To assess how the bias changes with the correlation between errors, ρ , I perform a sensitivity analysis in the spirit of [Altonji et al. \(2005\)](#) that estimates the bivariate probit model above under various assumptions about ρ . Specifically I estimate the model for $\rho \in [-0.3, 0.1]$. As controls, I include whether the individual is a Registered Status Indian, whether they are First Nation, Inuit, or Métis, whether they live on- or off-reserve, and their gender. I do not include the individual’s gender in the parent’s equation. I also include province and year of birth dummies and standard errors are clustered at the province level.

Figure 6 plots the average marginal effects of parental residential school attendance on the probability that the child completes high school for each value of ρ . Panel (a) displays the results for the full sample (who know their family’s history with residential schools) and panel (b) displays the results for those born after 1974.

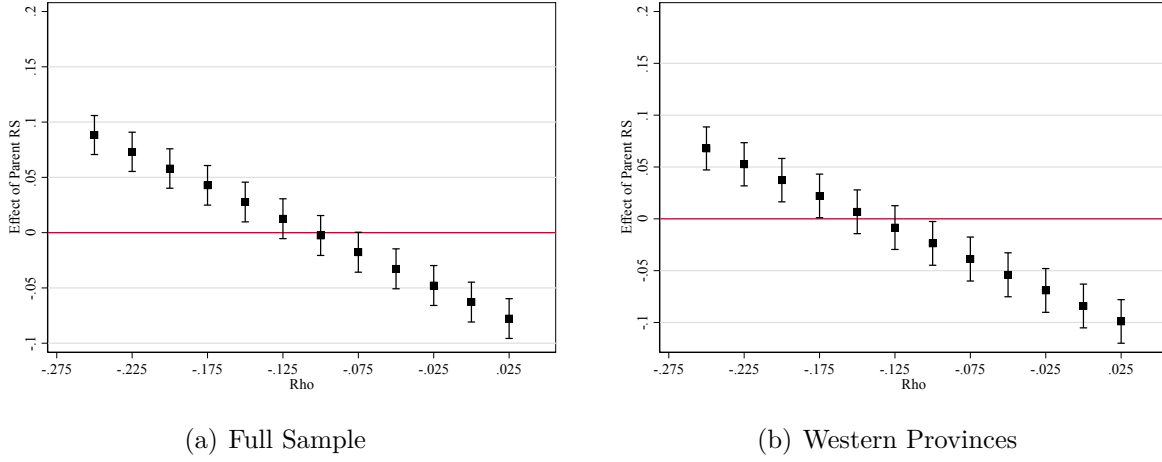
Given that students who were selected to attend residential schools were done so on the basis of characteristics that would be correlated with lower educational outcomes in the absence of residential schools—such as coming from more traditional backgrounds, more likely to be orphaned or come from troubled families—we would expect ρ to be negative. A natural upper bound on ρ is therefore 0. Panel (a) shows that if we assume no correlation between the errors of the selection and outcome equation, then the effect of a parent attending residential school on the probability of the child graduating high school is approximately -4.96 percentage points, and this value is statistically different from 0 at the 5% level. However, if the correlation between the two equations is -0.09 then the effect becomes 0,

²⁷For the same reasons estimating the analogous OLS regression

$$HS_{irt} = \alpha_c + \gamma_c RS_parent_{irt} + \mathbf{X}_{irt}\boldsymbol{\beta}_c + \psi_r + \zeta_t + u_{irt} \quad (11)$$

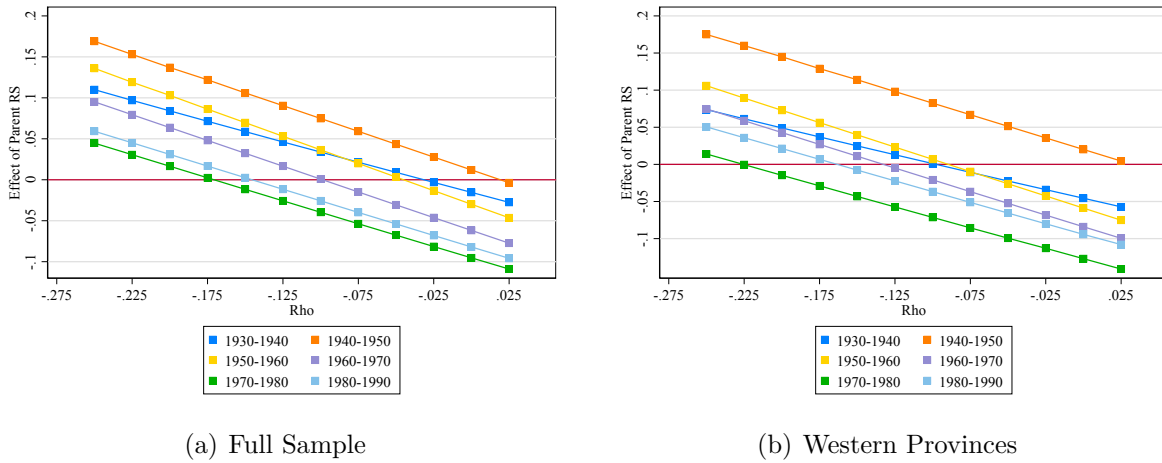
will also lead to biased estimates of γ_c .

Figure 6: Constrained bivariate probit effects of parental residential school attendance



Description: This figure displays the coefficient estimates from a bivariate probit for the effect of a parent attending a residential school on whether or not the child completes high school, while constraining $\rho \in [-0.3, 0.1]$. Regressions control for gender, whether the individual lives on a reserve, whether the individual is First Nation, Métis, or Inuit, whether they are Registered Status Indians, and year of birth and province dummies.

Figure 7: Constrained bivariate probit effects of parental residential school attendance by decade



Description: This figure displays the coefficient estimates from a bivariate probit for the effect of a parent attending a residential school on whether or not the child completes high school, while constraining $\rho \in [-0.3, 0.1]$. Regressions control for gender, whether the individual lives on a reserve, whether the individual is First Nation, Métis, or Inuit, whether they are Registered Status Indians, and year of birth and province dummies.

and for $\rho < -0.09$ the effect of parental residential school attendance on a child’s likelihood of graduating high school is positive.

Feir (2016b) estimates ρ for the outcome equation of one’s own high school graduation and the selection equation of one’s own residential school attendance to be between -0.222 and -0.234.²⁸ It seems reasonable to assume that the degree to which a parent’s selection and a child’s outcome equations are correlated is not greater than the correlation between an individual’s selection and their own outcome equations. Under this assumption, we can bound ρ below by the value of ρ from Feir (2016b), -0.234. Overall, this exercise shows that the effect of parental residential schooling on a child’s likelihood of graduating high school, $\hat{\gamma}_c \in [-4.96, 9.0]$ percentage points, thus we cannot rule out the possibility that the effect of a parent’s residential schooling on their child’s outcomes is positive.

We can redo this thought experiment for the sample of students who are born after 1974 and who are more likely to have had a parent attend a residential school during the peak of the system. Panel (b) displays these results. Again, bounding ρ from above at 0 translates to an effect of -9.47 percentage points. Bounding from below using the estimates from Feir (2016b) yields a coefficient of approximately 1.0 percentage point. So for this sample $\hat{\gamma}_c \in [-9.47, 1.0]$ percentage points.

The sensitivity analysis suggests that the bias in the effect of parental residential school attendance on children’s outcomes could be quite large and, based on the bounding exercise, we have seen that the effect of parental residential schooling on a child’s likelihood of completing high school may be positive or negative depending on the estimate of ρ and on the time period under analysis.

D Additional Data Sources

The control variables used in Section 4.2.1 were taken from Feir et al. (2020), but rely on a number of different original sources. These include:

1. **Statistics Canada Geographic Boundary Files:** Contemporary reserve boundaries were obtained from Statistics Canada’s Geographic Boundary Files: <https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-eng.cfm>
2. **Smithsonian Handbook of the North American Indians:** Feir, Gillezeau, and Jones (2020) digitized the ancestral territory maps of all Canadian Indigenous groups in the Smithsonian Handbook of the American Indian:

Sturtevant, William C. 1978. *Handbook of North American Indians*. Washington: Smithsonian Institution.

²⁸The observables used in Feir (2016b) are slightly different than those in the current analysis. Specifically, Feir (2016b) controls for gender, whether the individual comes from a single ethnicity background, their latitude of residence, distance to the closest city, band fixed effects and year of birth fixed effects. I control for each of the three main Aboriginal groups, which would capture the effect of someone having a background of multiple ethnicities. Further, I use province fixed effects which will not be capturing the exact same effects as the combination of band, latitude, and distance to city from Feir (2016b).

3. **Historical Trading Posts:** The location of historical trading posts in 1823 was provided to Feir, Gillezeau, and Jones (2020) by ESRI Canada. These data can be viewed online at <https://www.arcgis.com/home/item.html?id=13154b9a326e4399be30df48ac574634>
4. **Historical Railway Stations:** The location of historical railway stations was also provided to Feir, Gillezeau, and Jones (2020) by ESRI Canada. These data can be viewed online at <https://hub.arcgis.com/datasets/62becc07811d40448576e2fd23d1afcd>
5. **Ruggedness:** Average ruggedness by reserve was computed in QGIS by overlaying digital elevation model (DEM) files from the Food and Agriculture Organization of the United Nations with the census subdivision boundaries from Statistics Canada. DEM files available here: <http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/terrain-data/en/>. We computed average ruggedness by ancestral territory by overlaying the DEM files with the digitized ancestral territories from the Smithsonian Institution. The ruggedness index is computed based on the following methodology:

Riley, S. J, S. D. DeGloria, and R. Elliot (1999). A terrain ruggedness index that quantifies topographic heterogeneity. *Intermountain Journal of Sciences* 5(4), 23-27.
6. **Treaties and Treaty Clauses:** Treaties were linked to reserves by consulting the Map Room from used to be known as “Indigenous and Northern Affairs Canada”: <https://www.aadnc-aandc.gc.ca/eng/1290453474688/1290453673970> and treaty texts were obtained from <https://www.rcaanc-cirnac.gc.ca/eng/1370373165583/1581292088522>. Feir, Gillezeau, and Jones (2020) went through the historical treaties and constructed an indicator equal to 1 if the historical text included a clause related to the provision of education.