EXPLORING THE INFLUENCE OF SCHOOL AND COMMUNITY RELATIONSHIPS ON THE PERFORMANCE OF ABORIGINAL STUDENTS IN BRITISH COLUMBIA PUBLIC SCHOOLS

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ABSTRACT

The objective of the research was to determine how the dynamics of school and community context interact with school completion of Aboriginal students in the province of British Columbia, Canada. A large-scale exploratory analysis of secondary data was conducted. Data were derived from approximately 1.5 million school records of students enrolled in all public schools province-wide over thirteen years of time. The variability of school completion of Aboriginal students across time and across schools was a central research interest. Findings are presented at both the student- and the school-level. On-Reserve Status Indian students and highly mobile Aboriginal students emerged as subpopulations of Aboriginal students with significantly low school-completion rates. A hierarchical linear model (HLM) of interactions of Band status, student migration, socioeconomic factors and non-Aboriginal graduation rates with school completion rates of Aboriginal students is presented. Implications are discussed in terms of education policy at the school, school district and provincial level. As well, issues associated with collecting, interpreting and reporting data pertaining to Aboriginal school outcomes are discussed.

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CHAPTER ONE: INTRODUCTION AND BACKGROUND TO THE STUDY

My son began his school career in Prince Rupert, British Columbia. He and a number of boys in the neighbourhood began kindergarten with trepidation. The town was our new home, the weather unimaginably rainy, and the elementary school at the bottom of a small valley at the farthest end of town. The woman who had assisted us in finding a place to live had described this school as a place that had a rough reputation; there was a high level of "transient" students.

The town of Prince Rupert is located in the Northwest corner of the province, a few miles down the coastline from the beginning of the Alaskan panhandle. The town is composed of equal proportions of Aboriginal and non-Aboriginal people – a unique composition among towns in British Columbia. During the first day of kindergarten boys were crying and holding onto their mother's legs while girls were happily discovering each other and the stations set up for play. Almost all of these children were Aboriginal.

Many of these young children lived on our street and my son instantly acquired friends. These children extensively and unpredictably occupied our house as informal guests and conversely my son vanished outdoors or into their homes for long hours and with little ceremony. Non-Aboriginal kids lived on the street as well, and played outdoors with the rest, but their families had made arrangements for them to attend other schools in town.

I came to love my son's elementary school. To me it was a wonderful place, run by thoughtful teachers and a passionate principal.

During our time in Prince Rupert, I was initially employed as a substitute teacher. I also had a more permanent job as an Adult Basic Education instructor at the local college. Most of my students there were Aboriginal. Often stories of school experiences were shared during our class hours together. The stories surprised me even though I was somewhat familiar with the teachers, principals and schools they spoke about. However, I found the details of their experiences disheartening and difficult to reconcile. My students shared deep concerns over how their own children were navigating the local school system and what their futures held.

Kindergarten is long over. My son is now entering high school in a vastly different location (Vancouver, British Columbia). The kids he had played with will be also embarking on their high school careers. I often think of the people with whom we are no longer in contact in Prince Rupert. This research is conducted with the interest of those kids and those parents in mind.

Overview of the Study

This study is an exploratory analysis of data collected by the British Columbia Ministry of Education related to the school histories of kindergarten to grade twelve students over time. The purpose of this study is to investigate the disparate rate of Aboriginal students (in contrast to non-Aboriginal students) leaving high school in British Columbia and the disparities in school completion among Aboriginal students across British Columbia public schools. I am interested in how school demographics, as well as the economic and health profiles of communities in which schools are situated, influence the completion rates of Aboriginal students. Longitudinal data for eight cohort years of Aboriginal students will be examined. The study will review current educational policy in British Columbia regarding Aboriginal students at the provincial level and then provide policy recommendations based on the data analysis that address school outcomes of Aboriginal students at the school, school district and provincial level. A multi-level linear model will confirm the interrelationships of student population characteristics and school context with school completion.

Purpose of the Study

In the province of British Columbia, 47% of Aboriginal students, in contrast to 79% of all British Columbia students, complete high school (British Columbia Ministry of Education, 2006a). Remedial efforts by educators, the provincial government, and leaders of First Nations communities are focused on academic performance and school retention of Aboriginal students. At this time there is cause for some guarded optimism. The British Columbia Ministry of Education reports in their 2003/04 How Are We Doing? Demographics and Performance of Aboriginal Students in BC Public Schools (British Columbia Ministry of Education 2006b) that over a five-year period the Aboriginal school completion rate has increased 9%, almost twice that of the non-Aboriginal increase. Over this same time the Ministry of Education reports Aboriginal participation and performance rates in grade four, grade seven, and (now discontinued) grade ten reading, writing, and numeracy components of the Foundation Skills Assessment (FSA) – a standardized test administered province-wide – have improved.

However, the trend toward improved skill performance and higher graduation rates is not consistent across British Columbia schools. There is wide variation across the province and often within schools from year to year. Ungerleider (2003, p. 294) argues that successful learning depends upon a range of complementary social and educational supports for children and their families. It may be that there are patterns in school outcomes and that the differences between the Aboriginal and non-Aboriginal student performance are related to the school context or other broader community variables. Understanding such relationships could assist educators and advocates of Aboriginal students in working toward consistently higher graduation rates and higher achievement in school for Aboriginal students and initiatives that could be pursued that address both school and community factors identified as contributing to improvements in student performance.

The Aboriginal Education Enhancement branch of the British Columbia Ministry of Education articulates policies regarding the education of Aboriginal students. In recent years the Ministry of Education has been pursuing "Enhancement Agreements", or partnerships, with First Nations people province-wide. Enhancement Agreements now exist between twenty school boards and Aboriginal communities, and they are being negotiated in most of the other 39 school districts. The goals of the Enhancement Agreements are to improve the relationships between Aboriginal communities and schools and to improve academic achievement and graduation rates of Aboriginal students. The guiding policies behind these agreements make evident a desire to improve the climate of schools for Aboriginal parents and students by sharing decision-making and establishing cultural and language programs. As well, the Enhancement Agreements set the expectation that there will be close monitoring of the performance of Aboriginal students with the intent to use these data to set local school and school-district goals for continuous improvement. Foundation Skill Assessment results and the school completion rates are two of the key indicators used to determine whether Aboriginal students have advanced educationally.

It is not clear how well these initiatives are presently working in the radically different school and community contexts that exist across British Columbia. Nor are the lessons one can draw from the successes of Aboriginal students explicit. The challenge remains to understand not just whether general improvement has occurred, and whether or not the gap between Aboriginal students and non-Aboriginal peers has decreased, but what factors facilitate or impede the educational progress of Aboriginal students.

The literature devoted to Aboriginal education has focused on a narrow set of variables in accounting for Aboriginal students' poor school outcomes and for schools' poor performance with Aboriginal students. There are variables that are ignored that might be helpful in explaining the gap between Aboriginal and non-Aboriginal students in British Columbia. Those variables may include: the relative proportions of Aboriginal and non-Aboriginal students in the school, the proportion of On-Reserve or off-reserve Aboriginal students in the school, the size of the community in which the school is located, the socioeconomic conditions of the community, as well as the relationships among these variables. The aim of this study is to contextualize the available school performance data with these variables in order to explore their relationship to graduation rates.

Parameters of the Study and Research Questions

The main school outcome explored in this study is school completion. School completion is defined as graduation within six years of beginning grade eight. The subjects of this study are all students from grade eight to grade twelve within the provincial public school system in British Columbia throughout the school years 1991/1992 - 2003/2004. The performance of Aboriginal students in the province's independent schools, or Band-operated schools, was *not* examined.

There are two related research questions that guided the exploration of the thirteen years of student school-history data:

(1) How have Aboriginal educational outcomes changed over time at the high school level? and,

(2) In which high school contexts do the largest disparities and smallest disparities between Aboriginal and non-Aboriginal school completion occur?

Contribution of this Study

This broad, large-scale, exploratory data analysis was conducted with an unusually extensive data set of school histories of all students in all public schools over thirteen years of time. These data, masked for anonymity, have been collected by and generously provided by the British Columbia Ministry of Education. I believe this study is a unique and important contribution to understanding a critical issue facing British Columbia public high schools and of value to educators

working to address the inequality in the school outcomes achieved by Aboriginal and non-Aboriginal students.

The British Columbia Ministry of Education has developed an accountability regime of data collection and data-use strategies for districts and schools while initiating Aboriginal Enhancement Agreements. This dual commitment does not exist in other provincial jurisdictions in Canada or in the education systems of similar nations. The main focus of the analysis was to explore how the interplay of *both* school and community factors may be a source of difference in the performance of Aboriginal and non-Aboriginal student groups across the province.

CHAPTER TWO: ABORIGINAL EDUCATION POLICY AND RESEARCH

This chapter reviews and summarizes Canadian policy documents with the aim of understanding the background of provincial educational policy regarding Aboriginal students from kindergarten to grade 12. Following this there is a review of empirical and theoretical work that outlines issues in Aboriginal education that will provide examples of how the disparity of educational attainment of Aboriginal students and low school-completion rates is typically addressed in the research and academic literature.

The first theme – understanding current policy direction – defines how I understand policy, traces the existing policies of the British Columbia Ministry of Education and then provides an historical overview of key policy documents that preceded these current provincial policies. The second theme – inequities in school attainment – is organized by four ways that differences in schooling outcomes among minority students (such as Canadian Aboriginal students) are conceptualized and investigated in academic scholarship.

Current Provincial Policy and Aboriginal Education

Section 1: Understanding Policy Direction

The term policy has multiple meanings and is often ill defined in research (Ball, 1993; Hogwood & Gunn, 1984). I understand the term "policy" to mean "what we say we are going to do." In other words, any claims made in formal or informal media by those with jurisdiction to act are "policy." This definition and resulting perspective on policy may seem simplistic to those who struggle to conceptualize and provide theoretical models of policy or process models or analysis of how policy is operationalized, understood and enacted or not enacted. However, I believe this a useful *working definition* of policy.

For the purposes of this research "we" is the British Columbia Ministry of Education. However, other bodies such as the Government of Canada, the British Columbia Teachers'

Federation (BCTF), and the Assembly of First Nations have also developed policy regarding how education for Aboriginal students should be provided. I will discuss these policies as secondary "texts" that complement or contradict the "master narrative" of provincial educational policy.

Policy research differs from other research: "Unlike most social science research, most policy research is derivative rather than original. That is, it is produced by creative play with ideas and data already developed by others" (Bardach, 1973, p.120). It should be recognized that this "creative play" of the analyst is not neutral or objective, but is politically charged. For the product of policy analysis is advice (Weimer & Vining, 1989, p. 1) and the advice is typically offered to those who have a desire for change, or the means for change. "Policies typically posit a restructuring, redistribution and disruption of power relations, so that different people can and cannot do different things" (Ball, 1993, p. 13). Bardach (1973) cautions policy analysts on the political nature of their work. He explicitly acknowledges that policy research will be examined (his phrase is "attacked"), not just on intellectual grounds, but also by the subjects of the research and by those who are the politically motivated.

In my consideration of provincial Aboriginal education policy, I have followed the very pragmatic procedures of Eugene Bardach (1973). However, the overall objective of this research is not to evaluate educational policy per se in terms of appropriateness, effectiveness, efficiency, or political viability (Bardach, 2000, Hogwood & Gunn, 1984). Neither will this work address the policy-related question of whether schools have adequate resources to carry out the initiatives pursued under the ambit of improving Aboriginal student success. This research will not speak to the interpretation of these policies by those who enact them. Nor do I attempt to unravel how the policy reflects a compromise of many interests (Abele, Dittburner, & Graham, 2000). All of these analyses would be fascinating and valuable but they are not the focus of the data exploration.

My interest in policy is that it is a contextual feature of the public schools of the province, but of unknown impact and dimension on the performance of Aboriginal students. In this study, I am particularly interested in local differences that are evident among the schools of different communities. As Ball (1993) states: "Textual interventions (i.e. policy) can change things significantly, but I am suggesting that we should not ignore the way that things stay the same nor the ways in which changes are different in different settings and different from the intentions of policy authors" (p. 13). Also following Ball (1993), "it is not that policies have no effects, they do: it is not that those effects are not significant, they are; it is not that those effects are not patterned, they are.

But to reiterate, responses (as one vehicle for effects) vary between contexts" (p. 15). The data analysis was conducted with this observation regarding policy in mind. The basic contribution of this study was to identify and describe interrelationships of Aboriginal students, schools, and communities that are relevant and salient in light of the existing commitment and interest in Aboriginal education. The variability of these relationships across communities is the key research issue.

It is my view that policy is, essentially, a script written by the powerful. Ball (1993) offers the more refined insight that "policy texts *enter* (his emphasis) rather than simply change power relations" (p. 13). This point may be especially salient given that educational policies concerning Aboriginal students are part of a complex and long-standing effort to redress power and resource inequities of Aboriginal peoples nation-wide. The education policies reviewed here are set in the political and nation-wide backdrop of social justice for Aboriginal peoples and Aboriginal self-determination. Simultaneously and perhaps in countervailing direction, these educational policies are informed by broad, *international* movements in *general* educational policy. Ball (1998) describes two main policy directions occurring internationally in education. One, there is a movement to provide greater school choice and an increased separation of schools from the state. Two, is that the reforms and improvements that are called for in education are cast as being of benefit to national economic interests. Levin (1998) elaborates on this current policy climate and notes educational policy is now evaluated in relation to economic standards in contrast to the standards of social equity. Hence the policies specific to the British Columbia Ministry's Aboriginal Education Enhancement can be considered as a composite of local and national history, competing political interests, historical policies and practices, and current international trends in education.

Section 2: Current Aboriginal Kindergarten – Grade 12 Education Policy in British Columbia

This section provides an overview of the existing educational policies related to Aboriginal students in public schools as articulated by the British Columbia Ministry of Education. The goals of the Aboriginal Enhancement branch of the Ministry are provided, the education priorities highlighted, and the objectives of the Enhancement Agreements are outlined. Policy documents relevant to the direction currently undertaken by the Ministry are also discussed. Taken together,

these documents are a tapestry of revolutionary messages, calls for social and political change, and educational suggestions of both practical and abstract nature in order to address the education of Aboriginal students.

In my view, the formally stated Ministry initiatives seem more 'politically' than 'educationally' oriented. In other words, although the focus is improvement in educational outcomes of Aboriginal students, the policies are not focused on learning explicitly. These initiatives represent and embody political relationships between state and Aboriginal peoples and are less focused on educational practices and more focused on partnerships. By this I mean the policies are oriented toward encouraging school jurisdictions to work collaboratively with Aboriginal communities. Given the historical and current context of relationships between government agencies, schools and First Nations in Canada, that the sharing of power and the respect of cultures are the agenda in the education realm is not surprising.

Ministry of Education Aboriginal Education Goals

In the province of British Columbia, the Ministry of Education is responsible for the education of kindergarten to grade 12 students. A branch of the province's Ministry of Education is focused on the education of Aboriginal students. This branch is known as the Aboriginal Education Enhancement Branch. At the same time, the Government of Canada, through its Department of Indian Affairs and Northern Development, has jurisdiction over the education of Aboriginal students living on reserves. The majority of Aboriginal students in British Columbia are enrolled in provincial public schools; less than 10% of British Columbia's Aboriginal students attend Band-operated schools (Postl, 2005). Funding for Aboriginal students who live on reserves but attend British Columbia *public* schools is provided by the federal government. For these Aboriginal students and for all other self-identified Aboriginal students, the Province of British Columbia allocates an additional $1,000 per student per year.

The stated goals of the Aboriginal Education Enhancement branch are five-fold. They are:

(1) to improve school success for Aboriginal students;
(2) to increase Aboriginal voice in the public education system;

(3) to increase knowledge of Aboriginal language, culture and history within the public school system;

(4) to increase Aboriginal communities' involvement and satisfaction with the public school system; and

(5) to ensure the effective use of Aboriginal education funding

(British Columbia Ministry of Education, 2006c).

Ministry of Education Aboriginal Education Priorities

The priorities outlined by the Aboriginal Education Enhancement Branch (British Columbia Ministry of Education, 2004a) are more specific, addressing the following seven themes:

(1) Aboriginal Voice

(2) Data Analysis and Research

(3) Language and Culture in the Classroom

(4) Aboriginal Education Targeted Funds

(5) Improvement Agreements

(6) Communicating with the Aboriginal and Education Communities

(7) Building Commitment

Elaboration of these themes was recently provided on the Ministry web page, but has since been removed from their web site. I would argue these stated priorities were oriented toward the sharing of power *and responsibility* of the education of Aboriginal students with the Aboriginal community. Voice, cultural content, targeted funds, communication, and building commitment all involved a shared jurisdiction over the educational agenda. The second and fifth theme in particular had the potential to focus attention on the inequality of *academic* outcomes of Aboriginal and non-Aboriginal students.

In a similar way, the recommendations that are provided in the Ministry's yearly "*How Are We Doing? — Demographics and Performance of Aboriginal Students in British Columbia Public Schools*" (2003/04) (British Columbia Ministry of Education, 2006b) echo a primary concern with cultural

integration and respect. However, one specifically educational direction is offered: "Find out what makes school a successful experience for Aboriginal students and share the results" (p. 25).

Enhancement Agreements

Enhancement agreements are the working agreements among school boards, the local Aboriginal communities and the Ministry of Education to achieve the goals of the Aboriginal Branch. Currently these agreements have been negotiated in twenty of the 59 school districts in the province. These Enhancement Agreements are the result of a Memorandum of Understanding signed in 2003 by the Education Minister, the Minister of Indian Affairs and Northern Development, and the First Nations Education Steering Committee (FNESC). In the press release describing the nature and significance of the Memorandum of Understanding (MOU), there is an explicit connection made between educational improvement for Aboriginal students and a redistribution of power. This release is quoted at length below:

> The MOU will provide opportunities for First Nations to exercise greater control over the education of their members and will establish a framework to improve educational outcomes for Aboriginal students in British Columbia. The parties will work to develop agreements that provide First Nations with enhanced authority and jurisdiction over education of First Nation students On Reserve from kindergarten to Grade 12. The MOU will also provide for greater First Nation influence over the education of off-reserve members . . . . The MOU is a commitment by all parties to improve the quality of education for First Nations students. The MOU also fulfils recommendations made by the National Working Group on Education that determined the transfer of jurisdiction is a key ingredient for better educational performance. (British Columbia Ministry of Education, 2004b).

The focus of efforts in the Enhancement Agreements is "continuous improvement in the academic performance of all Aboriginal students" (British Columbia Ministry of Education, 2004b). The elements of the Enhancement Agreements break down to shared-decision making, regular reporting and evaluation, and the integration of the cultural needs of Aboriginal students into public school curricula. The policy directions as embodied by the Aboriginal Enhancement branch, the memorandum of understanding and the Enhancement Agreements of specific school districts all emphasize political change and cultural respect, as well as educational progress.

In the next section, I trace how these dimensions have evolved through previous policy documents to inform the current provincial educational policy context.

Section 3: Policy Antecedents

There have been several documents, national in scope, that are relevant to the goals of Aboriginal education as inscribed in provincial policy. Historically, Aboriginal affairs have been a responsibility of the federal government and education of On-Reserve Aboriginal students is a responsibility of the Government of Canada. (In contrast, for all other students, education is a provincial responsibility.) There are also important provincial documents that helped determine current policy.

The Hawthorn Report, or Survey of Contemporary Indians of Canada, Volume II (1967) commissioned by the federal government, brought to the public attention the vast disparities between Aboriginal and non-Aboriginal learners. Generally, Hawthorn promoted compensatory educational programs, greater cultural sensitivity, and fuller integration of Aboriginal students. Hawthorn recommended that religious denominational schools for Aboriginal students should no longer be funded and that funding should be provided to Band schools where the performance of Aboriginal students was at par with public schools. The difficulty of quantifying how performance across different student groups, different school structures, and different community contexts was to be measured was not addressed. However, over thirty years later, the report is considered relevant as many of the cultural discontinuity issues depicted and poor school outcomes quantified have not been resolved.

Indian Control of Indian Education (1973) was prepared by the National Indian Brotherhood (now Assembly of First Nations) and was a clear and direct call for immediate reform of policies and structure of educational services for Aboriginal peoples. This document recommended local control over education and acknowledged that policy broadly applied was dangerous because of great diversity of problems across the country. Abele, Dittburner, and Graham (2000) note that following publication of this document, the federal government was pressed to provide at least a consultative role to Aboriginal peoples in the production of educational policy directions.

"National Review of First Nations Education" or Tradition and Education, Towards a Vision of Our Future (Volumes 1, 2, 3) (1988) was an extensive national research effort, produced by the Assembly of First Nations. This document reviewed progress that had occurred on the adoption of policy directions put forward in the Indian Control document. The National Review document promotes the agenda of self-determination of Aboriginal peoples and also provides numerous concrete suggestions regarding education, including the recommendation that curriculum standards for Aboriginal students be at least equal to public schools.

"The Sullivan Report" or A Legacy for Learners: The Report of the Royal Commission on Education (RCAP) (1988) was a British Columbia provincial report. The report stated that the health, social, and economic conditions of Aboriginal peoples would need to be addressed in concert with improvement in educational attainment (Jeffrey, 1999). The report's recommendations support both self-determination of Aboriginal peoples, and their cultural inclusion in public schools, as well as a comprehensive education strategy for Aboriginal students in school districts province-wide. Sullivan called for *a partnership* between the school boards and Aboriginal communities.

"Gathering Strength" or The Report of the Royal Commission on Aboriginal Peoples: Gathering Strength (RCAP) (1996) is a federal document. This is a review of themes and policy recommendations in Aboriginal education and an evaluation of why little progress has been made. The document outlines specific measures to create culturally-inclusive schools and promotes new arrangements for sharing of power and jurisdiction between Aboriginal and non-Aboriginal peoples. (Jeffrey, 1999)

The Report and Recommendations of the Task Force on First Nations Education (BCTF) (1999a) was produced by a task force of the British Columbia Teachers' Federation for presentation to its 1999 Annual General Meeting. The report contains recommendations for improving the education of Aboriginal students through the practices of classroom teachers in British Columbia's public schools. The policies provided are highly detailed calls for cultural inclusion and structural integration of Aboriginal jurisdiction. This document recommends against the use of accountability measures, such as the standardized Foundation Skill Assessment test scores, in the evaluation of Aboriginal students' success.

Generally, the policy reports and documents outlined above represent an evolving and complex debate about whose interests the schooling of Aboriginal students has served and should

serve. The colonial agenda of assimilation, a legacy of racism, and struggle for sovereignty, and a history of poor outcomes for Aboriginal students inform the policy recommendations. In the next section, I will briefly discuss the policy recommendations common to these documents. I have organized the recommendations into three major themes: those serving a political agenda, those serving a social (cultural integration) agenda, and those serving an educational agenda.

The Political Agenda

I include in this category policy statements that describe who should hold jurisdiction over the education of Aboriginal students. This is the most contentious issue since schooling, broadly conceived, is a political activity complicit in serving state agendas. The fact that Aboriginal people have endured unequal power relationships with governments has created disruption, hostility and distrust. Education is central to the political struggle for self-determination. The Hawthorn Report envisioned education of Aboriginal students within the current system, despite the fact that system had severely under-served these students. *Integration* of Aboriginal students into a non-Aboriginal system was the main objective. Indian Control of Indian Education was the first policy document to argue that control over the schooling of Aboriginal students should reside with Aboriginal parents. This document called for Indian parents on Reserves to have the kind of jurisdiction over education that school boards exercise. The National Review maintained this position. Both Royal Commission documents attempted to reconcile these divergent positions by conceiving of education as a shared responsibility. Structures were recommended to enable sharing of control at the local Aboriginal community level.

Current policy in British Columbia of Aboriginal education appears to promote shared jurisdiction. However, the idea that Aboriginal education belongs to Aboriginal people alone hasn't been forgotten. It often forms the basis of the critique of the current system by Aboriginal groups or academics.

The Cultural Integration Agenda

In addition to the contentious issue of jurisdiction there is another theme of cultural welcome and acknowledgement in state-run schools. I include in this category any policy recommendations regarding making schools and classrooms more culturally respectful, relevant, sensitive and/or inclusive. These make up the majority of the policy recommendations in most policy documents. The underlying theoretical construct is that schools present a culturally "discontinuous" setting for Aboriginal youth. This may be a consequence of overt and systemic racism or through a mismatch and clash of the value systems, practices and worldviews of Aboriginal and non-Aboriginal peoples. It is argued Aboriginal youth perform poorly and avoid school because the school setting is an irrelevant, hostile and assimilationist location. The cultural discontinuity belief is a component of *all* of the policy documents I have summarized above. Some of the ideas that these documents present to alleviate cultural discontinuity are to fairly represent Aboriginal culture and history in the curriculum; incorporate Aboriginal worldviews into teaching methods and assessment practices; teach Aboriginal languages in schools; provide better in-service and improved teacher preparation; establish anti-racist curricula; and create a welcoming climate for Aboriginal students, parents, and Elders in schools. The link of cultural continuity to academic achievement or other school outcomes has not yet been confirmed by empirical studies. The complexity of measuring the theoretical construct of cultural fit and generating comprehensive student-outcomes data is a research challenge.

The Educational Agenda

I include in this category policy recommendations that are more directly related to academic attainment. While the cultural agenda described above submits that a better cultural fit can be achieved in school structures and school curriculum, these recommendations address the academic outcomes that schools generate. The policy documents seem to agree that Aboriginal students have not been served well by schools and that improvement of educational outcomes *must* occur. However, aside from this general goal statement there seems to be a reticence to provide details about how to promote academic success for Aboriginal students. Many of the documents, beginning with Hawthorn, call for special or compensatory programs for Aboriginal students. Often, vocational programs are suggested. (The streaming of Aboriginal students into vocational programs

has a long history and is problematic to many advocates of Aboriginal student equity.) The Indian Control document envisioned expanding schooling to include adults and preschool children and suggests life skills programs focusing on survival skills, career awareness, sex education, substance abuse, and suicide prevention. This document also suggests that policies relating to absenteeism, suspension and dropout of students need analysis and refinement. This point is echoed in the National Review.

Of special interest is the diversity of opinion regarding the use of standardized test data in assessing Aboriginal students. Norm-referenced ability and IQ tests are argued to be inappropriate and culturally unfair to Aboriginal students in the Hawthorn and Indian Control documents. The National Review suggests that culturally-appropriate measures be found and applied. These documents fail to specify what measures might be more acceptable, and to what cultures specifically. Both Royal Commission reports favour the use of measures (again unspecified) as a means to demonstrate and quantify inequity. However, as discussed earlier, the British Columbia Teachers Federation (BCTF) is opposed to the use of accountability measures to evaluate school success of Aboriginal students and echoes the concern that these measures are culturally inappropriate and that Aboriginal peoples have a right to define "success on their own terms". However the BCTF does support more academic strategies that may facilitate academic development such as Head Start type programs, early intervention programs, and school transition programs (BCTF 1999a, 1999b). Overall, the role of test data in representing Aboriginal student achievement generates dramatically opposing viewpoints among educators, governments and community stakeholders.

This brief review of both current educational goals and policy statements regarding Aboriginal students at the provincial level and the numerous educational documents that provide historical context to initiatives in British Columbia, reveals conflicting ideologies regarding cultural inclusion, separate school jurisdiction and the need for improved educational attainment exist in Aboriginal educational policy.

Literature Related to Poor School Attainment and Aboriginal Students

In this section I outline briefly the four main positions that both scholars and researchers take when conceptualizing the problem of poor school attainment. Where possible, I have tried to emphasize the Canadian context and present work specifically focused on Canadian Aboriginal students. However, work produced by American and Australian researchers and work regarding other minority groups where there has been a legacy of poor school attainment is also included. In the American context, the "minority students" are frequently Black or Hispanic students; however a small body of work about Native American students exists. This literature often focuses on early school-leaving or school dropout as one evident indication of inequitable school outcomes. I am categorizing these views as (1) the student characteristics model, (2) the institutional 'push out' argument, (3) the cultural discontinuity argument and (4) the community context model.

Theme 1: Student Characteristics

The most traditional approach in understanding the different educational outcomes of students has been to look for factors that differentiate those students who succeed in school from those who are at risk for school failure. Generally, researchers discover strong and consistent associations between poor educational outcomes and poor academic achievement, absenteeism, peer groups not valuing school, delinquency, low parent income, lack of role models succeeding in schools, and the like. However, this approach has been criticized as a construction of student *deficit.*

I include studies where at-risk students or students who have dropped out are surveyed or interviewed as part of this line of inquiry (for Canadian examples, see Mueller, 2005a Sullivan, 1988; Tanner, 1990; Statistics Canada, 2004; for an American example, see Jeffries & Carson, 2002). Surveying Aboriginal students is a strategy for gaining insight into school performance. Van der Woerd and Cox (2003) investigate student health-related characteristics such as drug and alcohol addiction of at-risk Aboriginal students in Alert Bay, British Columbia. In another example, Aboriginal students self-report that literacy is problematic and that they select easier course work (First Nations Education Council, 1997). In Mueller's Ontario study, both urban and rural Aboriginal youth and Aboriginal parents alluded to low socioeconomic conditions, poor communication, punitive school policies, as well as racism and discrimination as being influences on early school leaving. For rural Aboriginal students in particular, the adoption of students of adult

roles and responsibilities to family and community interfered with school attainment. American studies of Aboriginal students examine self-perception related to academic performance (House, 2003) and family connectedness (Machamer & Gruber, 1998). This line of research presents some methodological challenges because finding research participants is difficult when students have left the school system and because information offered on this sensitive topic is subjective. However, what students and ex-students who participate in such studies may report provides valuable insight into student framing and perception of interpersonal and school structure issues.

Theme 2: School 'Push Out'

In contrast to understanding poor educational outcomes by examining student factors, some researchers examine how the structures and dynamics of school institutions create challenges and problems for some students. This view asserts that student do not drop out of school; they are pushed out. There are several studies on the effects of school organization factors on dropouts (Bryk & Thum, 1989; Lee, Bryk & Smith, 1993; Reihl, 1999; Rumberger, 1995; Wehlage & Rutter, 1987). McLaren (1980) notes that personal problems of students such as access and transportation issues, pregnancy, and providing family care simply are not accommodated by most schools. Some researchers argue further that schools *explicitly* construct failure. Fine (1986; 1991) reveals how schools discourage and exclude certain minority groups and poor students from full participation. In Smyth & Hattam (2001; 2002) students, through interviews, provide insights about how their resistance to the status quo is amplified by encounters with uncompromising school systems. The students' experiences then further increase their marginal status within schools. Dehyle (1989; 1992; 1995) details in ethnographic work how Native students are systemically marginalized.

In a Canadian context, Kelly (1993; 2000) presents case studies on students, such as young mothers, served and not served in alternative schools. Levin (1992) argues that existing school structures actively create dropouts and that program changes would benefit Aboriginal students. There are numerous arguments for changes to the school program by proponents of Aboriginal education. Calls for anti-racist curriculum, culturally-relevant curriculum, and Aboriginal language courses (for example, see, Calliou, 1995; Labercane & McEachern, 1995, Leavitt, 1995; Sterling, 1995; Vallerand & Menard, 1984) are related to this line of thought. This research that investigates how schools as institutional structures contribute to dropping out of their students increases our

sensitivity to the hidden human cost of status quo arrangements. This research supports greater flexibility in constructing school goals, school organization, and program choices.

Theme 3: The Cultural Discontinuity Argument

There is a large body of work that views the differences in school attainment between groups of students as a mirror of larger societal differences in gender, class, ethnicity and race. This research conceptualizes schools as terrain where political interactions of culture and identity are performed. Some researchers explore how class structures are replicated in schools (a classic example is Willis, 1977) and tie students' assessment of the poor connection between education and job opportunities and social mobility to the poor school performance of these student groups. In a similar approach, Wood and Clay (1996) look at the academic performance of American Native students and the perceived structural barriers to mobility through education held by their participants. There is much theoretical work in this realm that seeks to illuminate the dynamics of racism, assimilation, integration, and segregation of minority groups in the school context. Some minority groups, it is argued, resist school as an institution in order to maintain their own unique cultural identities (LeCompte, 1987).

Ogbu (1992) presents the different political relationships minority groups have to the dominant political structure as an explanation of educational attainment differences in minority groups. A distinction exists in Ogbu's work between various "voluntary" or immigrant minorities, who may believe that school attainment will lead to further economic opportunities, and "involuntary" minorities whose relationship to the dominant group involves not only discrimination, but a history of conquest, colonization and slavery (Gibson & Ogbu, 1991). In his typology of minority groups, Aboriginal students occupy an "involuntary minority" status and are disadvantaged by a politically entrenched exclusion. Ogbu argues that minority groups may perceive that social and economic rewards associated with educational achievement will be withheld by the dominant group, making school attainment irrelevant. Further, school may be viewed as an agent of continued oppression of cultural and language differences by members of involuntary minorities. Cummins (1997) has used Ogbu's popular framework in discussing Aboriginal students in the Canadian context.

In much of the discussion of the power imbalance Aboriginal peoples face, schools are critiqued as agents of "cognitive colonialism." Marker (2000) notes that Aboriginal groups are very distinct from other visible minorities and these distinctions are poorly understood by educators and education policy makers. As descendents of the first people they have a profoundly different relationship to local place, as well as different historical and economic relationships to white settlers. Marker argues these distinctions are ignored or poorly understood by educators and education policy makers. Others argue that experiences in public schools create cultural discontinuity for Aboriginal students. They conclude that the aspirations, learning styles, discourses and value systems, worldviews and histories of Aboriginal cultures are devalued in schools (Hampton & Roy, 2002; Kanu, 2002; Stairs 1995; Wall & Madak, 1991). This theme is explored in the Australian context as well (see Brady, 1997; Hewitt, 2000; Hickling-Hudson & Ahlquist, 2003; Nichol and Robinson, 2000) with particular focus on clashes created by the second dialect (Aboriginal English) of students (for example, Cahill & Collard, 2003; Malcolm & Sharifian 2005; Purdie et. al. 2002). Schools are posited to be negative and destructive locations for Aboriginal students. Yet, for some, the relationship of identity and school is not necessarily so direct; the strength of cultural identity developed within individual Aboriginal students may support their academic performance in public schools (Brade, Duncan, & Sokal, 2003; Dehyle, 1992). There are numerous calls for schools to support and enhance the cultural strength of Aboriginal students (for example, Archibald, 1995) and some urge a deep and meaningful integration of Aboriginal cultures into school cultures, for example, using the worldviews of Aboriginal peoples as the teaching strategy (MacIvor, 1995; Stairs, 1995). Others advocate that Aboriginal people should have jurisdiction over their own education systems to insure strong cultural ties and healthy identities (Hookimaw-Witt, 1998; Kirkness, 1998).

The literature related to the social/economic replication and cultural discontinuity created by schools provides an important theoretical base for acknowledging the critical and political role the school institution plays in pluralistic societies.

Theme 4: School and Community Context

There is a small body of research that explores the issue of local differences in school achievement and dropout by collecting and evaluating data pertaining to students, school structures,

and social and economic health conditions of different locations. A renowned example of this approach is Equality of Educational Opportunity (Coleman et. al., 1966). This study, often referred to as "The Coleman Report", was commissioned by the American government. Coleman examined material differences among districts (not schools), and concluded that these differences were not large enough to produce differences in racial groups' outcomes. He found that student composition of schools, socioeconomic status associated with the residential areas around schools, factors related to the student's home environment, and peer group aspirations were related to different performance among districts (in Bennett & LeCompte, 1990; Showse, 2002). The Coleman Report is both lauded as the most significant educational research study of the century, and feared for the political interpretation of the findings. Some feel the findings suggest that funding to school sites is not potent enough to level the playing field for disadvantaged student groups. This finding destabilizes a deep belief that schools are democratic institutions and provide opportunity for social and economic mobility *equally* to students.

Conducting such large-scale, comparative studies of schools is difficult for methodological, logistical, and financial reasons. Such studies are data-driven, and it is difficult to secure measures that mean the same thing across different contexts. The data are multi-level (student, school, family, community, district, state) and there are few models of how interrelationships occur (Rumberger & Thomas, 2000). As MacKay and Myles (1995) note in their survey on the causes of Aboriginal student dropout, locating even basic statistical data is "surprisingly difficult" (p.158).

Smaller scale studies have been attempted. Cameron (1990) has connected school performance data of secondary schools with school composition data in an examination of the Aboriginal school attainment in British Columbia. In the United States, Ward (1995; 1998) explores the interactions of schools and communities with Indian students in rural settings, and compares school context and cultural differences of Native communities in another rural setting. She observes how effects of multi-level factors vary by school.

I feel that research of this nature is valuable in shedding light on differences in school attainment of Aboriginal students in British Columbia while potentially modelling the subtlety of the interconnections of schools with their communities. Policy recommendations that arise from such research should not necessarily present grounds for abandoning school sites as locations for change. Schools should not be considered the sole agent of social equity, but a highly important one. By

considering how other variables affect student performance such as those found in the community context, interventions can be both refined within schools and broadened to agencies beyond school.

This study is informed by all of the research reviewed here. However this study will follow the line of inquiry provided by data-driven comparative studies of attainment differences of student groups at schools.

CHAPTER THREE: METHODS

This study examined patterns of educational outcomes of cohorts of Aboriginal students in public schools in British Columbia over time. The aim of the study was to examine the relationship of school context and community context to Aboriginal school completion. Variables such as school size, proportion of Aboriginal to non-Aboriginal students within schools, and socioeconomic conditions associated with school communities were examined. This study was an exploratory analysis of data provided by an external source (the British Columbia Ministry of Education). The methods the study pursued are unique and responsive to emerging features in the data. In a similar way analysis was guided to emerging features of the data.

This chapter is divided into four sections:

(1) A description of the four data sources used in this study;

(2) A description of the variables used in this study;

(3) A description of the procedures followed in structuring the data and analyzing the variables; and

(4) Analysis of variables

Section 1

Data Sources

The British Columbia Ministry of Education provided the data for this study through Edudata Canada, a data broker housed in the Faculty of Education at The University of British Columbia. Edudata Canada specializes in data related to British Columbia's kindergarten – grade 12 school system. Both the Ministry of Education and Edudata have generously extended assistance and support in matters related to the internal structure of the data and upgrading the data. The initial data were received on November 18, 2004.

Four data sources were used to create the variables explored in this research. They are described in detail below:

Data Source A: The British Columbia Ministry of Education Student Retention File

The School Retention File provided by the British Columbia Ministry of Education was the source of student-level data. This data file was the foundation of this study. A data set based on the British Columbia Ministry's School Retention File was created by Edudata by means of merging data associated with two complete enrolments of two school years (1991/1992 and 1998/1999). 136 variables associated with individual students were requested. Student identities are masked by encrypted codes by the Ministry, and these codes were scrambled by Edudata before the data were released to insure student identification would not occur.

Students who were *not* enrolled at *any* grade level, in *any* school in British Columbia, in *either* of these two school years *are not included in the data set.* For example, a student who may have temporarily moved or dropped out of the school system in either of these two particular years was not included. While this data set represents the population of British Columbia students over thirteen years of time, it is missing an unknown number of students. Hence, this data set under represents mobile students and students whose school careers have been interrupted.

Data Source B: The British Columbia Ministry of Education School Census

An abbreviated version of the School Census data file was provided by the Ministry of Education. The file lists all schools in operation in the province of British Columbia.

Data Source C: Statistics Canada Neighbourhood Socioeconomic Status Indicators

Socioeconomic status variables associated to individual students were not requested for this analysis due to privacy concerns. However, socioeconomic status indicators of communities and neighbourhoods in which schools are nested were examined.

A data file of four Statistics Canada socioeconomic status variables calculated at the two-mile radius of each school was obtained from the British Columbia Ministry of Education through Edudata. This information was derived from the Year 2001 Statistics Canada Census. Schools were identified by a ministry-assigned code number in this file.

It should be noted that these variables convey information about the populations of communities at a specific time (the year 2000) and may not adequately capture the context of students in years preceding or following the census data collection.

Data Source D: British Columbia Ministries of Health and Education Social Deprivation Index

Socioeconomic status indicators that more closely reflected the prevailing conditions of Aboriginal community members, as distinct from all community members, were sought. Such information is not readily or comprehensively available. For example, Statistics Canada has collected information of this sort, but when the numbers of Aboriginal communities are small, the information is masked. The matter is further complicated by the fact that many Aboriginal communities decline to release such information to Statistics Canada. Finally, the determination of "Aboriginal" as a descriptor of a population is contentious and subject to various and changing interpretations.

A Social Deprivation Index that was created jointly by the British Columbia Ministries of Health and Education in 2003 was accessed on line (see www.bced.gov.ca/gov.bc.ca/communitylink/0304 funding_allocation.htm). This index is published on the British Columbia Ministry of Education web site. The CommunityLink (the umbrella organization organizing this funding formula and source) Social Deprivation Index Allocation Tables were used to obtain the social deprivation index ratings for both Aboriginal *and* non-Aboriginal communities. The index was created as a mechanism to assist in distribution of funding and resources across school districts based on student need. The index is constructed from measures of financial hardship, health, educational attainment, and social conditions of community populations.

It should be noted that these variables convey information about the populations of communities at an unspecified point in time and may not adequately capture the context of students in years preceding the 2003 publication. This index was the sole measure I could locate that provided information related to Aboriginal communities province-wide.

Section 2

Variables Used in the Study

Data Source A: School Retention File Variables Used in This Study

136 variables related to the school history of each student in the province of British Columbia were provided in Data Source A. These variables provided information regarding the school career of individual students such as:

(1) Graduation date

This is the month and year a student graduates.

(2) Grade level by year

This is the grade level a student was enrolled each year.

(3) School district by year

This is the school district number in which a student was enrolled each year.

(4) School by year

This is the ministry code number of the school a student was enrolled in each year.

(5) Aboriginal status by year

This is an indicator of school years where a student identifies as Aboriginal on the yearly 1701 Student Data Collection census form.

(6) Aboriginal status ever

This is an indicator of whether a student ever identified as Aboriginal on a 1701 Student Census Form.

(7) Public or independent school by year

This indicates whether the school a student was enrolled in each year was public or independent.

(8) English as a Second Language by year

This indicates whether a student was categorized as an English as a Second Language student by year.

(9) Band (On-Reserve Status) by year

This indicates whether a student was funded as an On-Reserve Status Indian student each year.

(10) Band code

This is a code number associated with Reserves.

(11) Culturally-specific programming by year

This indicates whether a student was enrolled in Aboriginal cultural, academic support, or other school programs each year.

Data Source A: School Retention File Variables Derived To Support Further Analysis

I created an additional nineteen variables by manipulating and aggregating the variables during the process of analysis of the Data Source A variables in order to support further analysis. These variables provided information about individual students regarding:

(12) Six-year school completion

Whether or not a student graduation occurred before, within, or after, six years of entering grade eight was calculated.

(13) High school changes

The number of different high schools a student was enrolled at between the first year of entering grade eight to the fifth year inclusive was determined.

(14) School interruption

A flag was created if students had interrupted school between the first year of entering grade eight to the fifth year inclusive was determined.

(15) Within-district school change

A flag was created if a student moved to a school within the original high school district during five years of high school.

(16) Between-district school change

A flag was created if a student moved to a school beyond the original high school district during five years of high school.

(17) School attrition

A flag was created if a student dropped out of the British Columbia school system during high school and did not return in the six years following entering grade eight for the first time.

(18) Total years identifying as Aboriginal

The total number of years that a student identified as Aboriginal was calculated.

(19) Total years Band status

The total number of years that a student was funded as a Band student was calculated.

(20) Total years enrolled in Aboriginal cultural, academic support, or other school programs

The total number of years a student was enrolled in Aboriginal cultural, academic support, or other school programs was calculated. "Other" is not specified in the Ministry data file and likely is used to designate programs developed in schools and school districts that are not standardized across the province. There is no information on what the cultural or academic programs entail, aside from the basic description implicit in their titles; it may be expected that there is wide variation across schools, across school districts and over time on the content and structure of these programs.

(21) Total years in the British Columbia public school system

The total number of years a student was enrolled in the British Columbia public schools.

Data Source B: The British Columbia Ministry of Education School Census Variables Used in This Study

The abbreviated British Columbia School Ministry data file contained variables associated with all schools (kindergarten to postsecondary) operating in British Columbia extending back in time to the 1991/1992 school year. These were:

(22) School code number

This is the unique Ministry code number assigned to the school.

(23) School years of operation by year

This lists the school years in which the school operated. Many schools have opened and closed in British Columbia since the 1991/1992 school year.

(24) School location

This is the city where the school is located.

(25) School type

The type of school (specifically, Standard, Alternate, Youth Custody, Continuing Education, Distance Education, or Long Term Education). Schools can vary by the type of students they service.

(26) School grade structure

A categorization of the grade structure of the school (specifically, Elementary, Elementary Junior Secondary, Elementary Secondary, Junior Secondary, Middle School, Secondary, or Senior Secondary). Schools vary in the grades accommodated at the school.

Data Source B: The British Columbia Ministry of Education School Census Variables Derived To Support Further Analysis

An additional variable was derived from this information:

(27) School district number

The Ministry School Code is constructed so that school district associated with the school is evident. (It was also possible to determine whether or not schools were public by examination of the Ministry code number. The code numbers assigned to schools made independent schools and Band school easily identifiable.)

Further, a variable was created to supplement this information:

(28) School grade level

The grade structure of as many schools as possible was specified by downloading a current list of operating schools from the Ministry website (see www.bced.gov.bc.ca/apps/imclWeb/schoolcontacts.doc) and entering the information by hand (for example: grades 6-8, grades 8-12).

Data Source C: Statistics Canada Neighbourhood Socioeconomic Status Variables Used in This Study

There are numerous measures of income, educational attainment and employment available through Statistics Canada. Four were selected to provide a rough indication of these conditions in school neighbourhoods across British Columbia. The Statistics Canada variables were:

(29) Education attainment (proportion less than high school)

This is the proportion of the population that indicated attainment of less than a high school education on the 2001 Census in a 2-mile radius of the school address.

(30) Population fifteen plus: Average income

This is the average income of all Census respondents over the age of fifteen in a 2-mile radius of the school address.

(31) Proportion of families less than $20,000 income

This is the proportion of families in a 2-mile radius of the school address whose income is less than $20,000 on the Census.

(32) Fifteen Plus Unemployment Rate.

This is the proportion of the population over the age of fifteen who were unemployed in a 2-mile radius of the school on the Census.

Data Source D: British Columbia Ministries of Health and Education Social Deprivation Index Variables Used in This Study

The following variables were used from the Social Deprivation Index:

(33) Social deprivation index Aboriginal

This is a number that represents the prevalence of conditions of social deprivation salient to Aboriginal youth in a British Columbia Local Health Authority.

(34) Social deprivation index non-Aboriginal

This is a number that represents the prevalence of conditions of social deprivation salient to non-Aboriginal youth in a British Columbia Local Health Authority.

The Social Deprivation Index is constructed so that the rating "100" establishes the prevalence of social deprivation of the province as a whole. An index rating of "150" therefore would indicate the conditions of social deprivation salient to the youth of the community are 50% greater in that particular community than for the province as a whole. Higher numbers indicate the correspondingly higher prevalence of community deprivation. High deprivation is not positive.

Section 3

Procedures

The procedures followed in this data exploration are outlined below. These procedures are described as occuring in three stages. Stage one involves the creation of a data set where the four data sources described above were merged. Stage two is where this data set was explored to determine its basic features. Finally, in stage three a model of interactions within the multi-level data was constructed.

Stage One: Creating Multi-Level Data

In order to provide insight on patterns and change of Aboriginal student outcomes and the possible influence of school and community context, the data were conceived to be *three-dimensional.* In other words, the story of interest was one of *students* over *time* across *place.* The structuring of the four data sources in order to explore this three-dimensional story is outlined generally below. (Appendix B contains SPSS code that replicates the same procedure).

1.Creating Grade Eight Student Cohorts

In this study, the case histories of over 1.5 million students enrolled in the public school system of British Columbia over thirteen years (1991/1992 – 2003/2004) were analyzed to explore the issue of Aboriginal school outcomes across the province over time. Student cohorts are the main unit of analysis in this study. This meant a reorganization of the ministry data set. Rather than examining administrative data representing 1.5 million students, I grouped all students and associated data into cohort years using Data Source A: The School Retention File. From the Retention File, I created more manageable data files containing the administrative school history record associated with grade eight cohorts. I constructed eight files containing the administrative record associated with eight non-Aboriginal grade eight cohorts, and eight Aboriginal grade eight cohorts.

2.Defining School Graduation

Each cohort was considered to have six years in which to graduate. Graduation defined in this way – completion of school within six years of beginning grade eight – is the main school outcome examined in this study. This definition of "graduation" does not include students who graduated on dates *after* six years of beginning grade eight. The terms "graduation", "school completion" and "six-year completion" are used interchangeably throughout this document. Graduation dates were refreshed on October 27, 2005 as the Ministry had updated this component of the Student Retention File.

3.Aggregating Student Variables to the School Level

In order to analyze patterns associated with students at the school level (such as composition of the cohort), in addition to cohort outcomes at the student level (such as graduation), variables were aggregated to the school level. Typically, the school level of interest was the school the students were enrolled in their first (grade eight) year of high school. However, analysis also was conducted on the school cohort composition and school outcomes associated with the school students attended in their fifth (grade 12) year of school. Aggregation occurred using the Ministry school code number as the school identifier.

To identify the school *explicitly* required merging this new file to the school census file. The complexity of the school census file created challenges in creating certainty that the nature and type of each school in the province could be defined. Over the time period of interest in this study (1991-2005) many schools closed, changed their names, transformed their grade structures, altered the service delivery structure, or opened. As well, the province underwent a process of district amalgamation; many schools were reassigned district numbers. A "working version" for this purpose of this analysis of the school Census file was created.

It should be noted that data entry error also created difficulty in establishing a clear record for each school. Schools were miscoded, or coded with spelling errors in their name or city location creating hidden duplication of schools. The city locations assigned to schools changed over the years for some schools. Over time schools tended to become associated with larger towns as opposed to the names of smaller geographic areas. The school census data were refreshed in April 2005 and many of these data entry issues had been addressed.

4.Merging Statistics Canada Variables in this Study

Data Source C: Statistics Canada Neighbourhood Socioeconomic Indicators was merged to the working version of the School Census file. Due to some of the issues regarding the Ministry School Census detailed in the analysis referred to above, there were a small number of schools where the Statistics Canada information, once merged, was incomplete.

5.Merging Social Deprivation Index Variables in this Study

Data Source D: The Social Deprivation Index was merged to the working version of the School Census File. It should be noted that population centres were not always clearly referenced in this web document, as Social Deprivation Index ratings were associated both with school district jurisdictions and Local Health Authority jurisdictions. It was necessary to determine which population centres were subsumed under each Local Health Authority jurisdiction. This information was then used to create a variable representing corresponding Social Deprivation Index ratings to the city level. Where this information was not explicit, schools were randomly assigned to a Local Health Authorities subsumed by their school district. The number of cases where this was necessary was less than 3% of the total cases.

Stage Two: Exploring Student-Level Data and School-Level Data

In order to begin to determine what patterns existed regarding Aboriginal students in high schools, Data Source A: The School Retention File was examined extensively. A preliminary investigation of the role of community socioeconomic context also occurred. These analyses are listed sequentially, but in fact many of these occurred concurrently.

6. Exploring Individual Student Outcomes

I examined single Aboriginal student case studies. This involved examining the school grade level of an individual student over time and the nature of the schools enrolled at over time and whether or not a student was identified as an Aboriginal, non-Aboriginal or Band student in each year. By comparing individual student cases to one another, I observed the large variety of possible school trajectories and observed the possibility of inconsistent identification of Aboriginal status or Band status of the same student.

7.Exploring Individual Student Outcomes at the School Level

I examined entire grade eight cohorts and determined the educational trajectory of each student over six years of time enrolled in a given school. This involved determining the proportion of students transitioning to each grade level, and the proportion of students within the cohort at a given school who experienced other grade level progression trajectories, and proportions of student graduation associated with various trajectories. The complexity of understanding school level outcomes due to the large variety of the grade progression of students became evident.

8.Comparing Cohort Outcomes at the District Level

Case studies of school districts were conducted. I examined and compared the school completion rates and attrition rates of Aboriginal students and non-Aboriginal students in all high schools within a given district to determine what differences were evident in student demographics, student cohort trajectories and student graduation levels.

9.Tracing Individual Student Mobility

I mapped out the journey across schools of individual Aboriginal students who changed schools in order to address the question: Where did students go at each grade level? Where did they leave from at each grade level?

10.Comparing Aboriginal Cohorts and Non-Aboriginal Cohorts at the School level.

I compared Aboriginal and non-Aboriginal cohorts at the school level to address the questions: What where the differences in the cohort size, school completion rates, and attrition level and school trajectories of the two cohorts? Grade-to-grade cohort attrition was calculated by determining the grade level associated with the last year students were enrolled in schools. High school interruption was determined by calculating the number of students who had enrolled in grade eight but were absent from the British Columbia system for one or more years in the following five years. Secondary Ungraded (a designation used to indicate that students are not in a regular "grade level" program) rates were obtained by calculating what proportion of students had ever been given this grade designation in their high school (grade 8-12) career. In addition, high school students who were categorized "Elementary Ungraded" (a minute proportion) were given this classification for the purpose of this analysis.

11.Comparing Graduation at the School Level over Time.

The number of students in the cohorts and the number of students who completed school within six years for both Aboriginal and non-Aboriginal groups was determined for each of the eight cohort years. These rates were aggregated from the student-level and merged to the working school census file. I determined graduation rates *pooled* over eight years (1991/1992 – 1998/1999 school years inclusive). In other words, a pooled graduation rate is constructed by totalling *all* students who graduated over those eight years and dividing by all students who were enrolled. This pooled rate often differs from an average graduation rate which was also calculated.

Comparisons were made in graduation rates of Aboriginal and non-Aboriginal students. As well, comparisons were made of graduation rates of the eight cohorts: Had the school completion of either Aboriginal or non-Aboriginal cohorts changed over eight years? Comparisons were made of Aboriginal Cohort completion rates at high schools within the same city, and/or same district.

12.Change in School Demographics over Time

I compared differences in the student demographics in schools over grade levels to address these questions: In what way had the cohort composition in terms of size changed between the time when a cohort began their first year of high school and the fifth year? (In other words, the school attrition rate of a cohort was determined.) How many Aboriginal students of a cohort had moved to other schools in the district or across the province? How many new students had joined the original Aboriginal cohort? From other schools in the city or from across the province?

13.Comparing Graduation Rates over School Contexts

A preliminary investigation of patterns in school composition or cohort graduation that existed across the range of socioeconomic conditions schools in British Columbia are nested within also was conducted.

103 public high schools across British Columbia were selected from the available 296 for preliminary investigation of school-level outcomes (for a list of these see Appendix A). These 103 public schools typically have enrolments of eight Aboriginal students or more in their 5th high school year during the years examined in this study. Schools not selected for inclusion were independent schools, alternate schools, continuing education schools, schools with typically fewer than eight Aboriginal *or* non-Aboriginal students in their fifth year, and schools for which there are incomplete data provided by the Ministry of Education. By focusing on these 103 schools,

information regarding 80% of the Aboriginal students attending British Columbia public schools are incorporated.

The remaining 20% of Aboriginal students were enrolled in schools not included for investigation. The high school locations where fewer than seven Aboriginal students are typically in a student cohort are not included in this school-level analysis. While Aboriginal students may attend these high schools, and mobile Aboriginal students may attend these schools, the information available by studying the patterns associated with small numbers of Aboriginal students in school settings is not the focus of this study.

In order to view where outliers, or atypical schools, are in relation to the 103 schools, the standard deviations of both non-Aboriginal and Aboriginal "pooled" completion rates (or *total* rate of *all* students over eight years) were calculated.

14. Determining Trends in School Aboriginal Cohort Completion

In order to provide a sense of whether trends of increasing graduation rates over time exist, given the cohort-to-cohort variability over the years, the slope from the 1991/1992 school year to the 1998/1999 school year was calculated. The information this slope provided did not adequately convey how consistent the change was *throughout* the years (as opposed to *from* the first year of available *to* the last year of available data.) A correlation of each cohort year's graduation rate to the other cohort's graduation rates was calculated. These correlations were an attempt to convey the consistency of change over time.

15.Controlling for School Structure

In order to control for the possibility that students who changed schools only once had done so *because of the structure* of the schools in their location – background information was sought on the grade structure of each high school in British Columbia. The school census file provided categorization of school type ("standard") and school grade structure ("secondary") and this provided a general sense of the nature of each school.

The records of all students who had changed schools once within their school district in the '98 Aboriginal cohort were examined. What was known about the current grade structure (school year 2004/2005) of the schools these students had originally enrolled in and that of the schools they had changed to was used to determine whether the one school change associated with each student

was due to grade progression. Students were also compared to their school cohort peers for additional evidence that the entire cohort of students had changed schools. In 45 student cases no determination could be made regarding the cause of the one school change. These students are not included in school change calculations.

The number of school changes students may have made prior to high school has *not* been calculated. The number of school changes is determined by noting where a student is enrolled in September of each school year over five years. This calculation is not sensitive to the unknown number of students who move temporarily *during the school year* and return to the school where they originally enrolled. This calculation also does not include students who may be still enrolled in high school in their 6th year, but changed schools in their 6th year of high school. (This group was 1% of the '98 Aboriginal Cohort.)

16. Comparing Mobility Patterns of Aboriginal Students across Schools

The number of school changes that occurred in high school was calculated for each Aboriginal student. School change was then categorized as *within-district* school change or *between district* school change.

It should be noted that students may have changed high schools within their original district or within their destination district *in addition* to changing schools across districts. (For the purposes of this analysis, if a district change occurred between grade eight and the fifth year of high school, the students were included in the between-district school change category.)

Stage Three: Modelling Interactions within the Multi-level Data

A statistical model of the interactions of student demographics in schools across community contexts over time in British Columbia public schools was constructed. Initially regression analysis was conducted with data related to each of the eight cohort years. A regression analysis also occurred with all data pooled over the eight years. The independence or intercorrelation, and contribution or lack of contribution, of the available socioeconomic and non-Aboriginal school outcome variables were established in this process. Due to the missing data that exist as an artifact of this data, a model that could control for this was required. It is also evident that the data

inherently are multi-level (students are nested within schools and these are nested within communities).

Hierarchical Linear Modelling (HLM), a statistical multi-level modelling program available on SPSS, was a more suitable statistical tool. The benefit of this modelling procedure is that the missing data associated with specific cohort years can be controlled for and the variances associated with differing community contexts can be more fully expressed. Expertise in writing the computer programming to run this statistical was provided by Fernando Cartwright after extensive consultation regarding the nature and structure of the data. He has very generously consented to have his SPSS programming included as a technical appendix (see Appendix B).

Section 4
Analysis of Variables

Two questions implicitly guided analysis:

(1) What happens to a cohort of Aboriginal students as they progress through high school?

(2) How can student level school record data (indicating such things as a student's grade level and school enrolled) contribute to the development of educational policies related to improved Aboriginal school performances for all educational stakeholders?

Hypotheses were tested as patterns within the data emerged and failed to emerge. Formal procedures such calculations of range, mean, standard deviation, standard error, bivariate correlation, intercorrelation of variables, regression and multiple regression were employed in order to generate a sense of both the complexity and cohesion within the data. Both Excel data spreadsheets and SPSS data management programs were used.

In addition, the data story structured in PowerPoint visuals was used in presentations and discussions with numerous members of the educational community at large. The time and feedback donated by members of the academic community, the provincial Ministry of Education, Edudata

Canada, and principals and teachers in the Vancouver School Board played a key role in refining understanding of what the data represented and guiding further analysis. Finally, at the conclusion of the exploratory analysis Fernando Cartwright, a data analyst with expertise in large longitudinal data sets, was consulted regarding the construction of the Hierarchical Linear Model.

Additional notes on analysis follow:

Note A: Grade Eight Cohorts

A cohort was defined as the group of students who began grade eight for the first time in a given school year. No student belonged to more than one cohort. There were eight cohort years available for study when school graduation within six years was of interest. The remaining five cohorts that can be examined are currently completing their education and have yet to graduate.

Note B: School Graduation

Because a school year begins in September of one year, and ends in June of the following year, confusion can easily develop in defining school cohorts by school years. Table 1 may clarify the school trajectories of each cohort.

Table 1: School Trajectories of Eight Cohort Years

Cohort Name	Students in grade eight for this first time during the school year:	Expected 6-Year Completion Date:
Cohort '91*	1991/1992	June 1997
Cohort '92	1992/1993	June 1998
Cohort '93	1993/1994	June 1999
Cohort '94	1994/1995	June 2000
Cohort '95	1995/1996	June 2001
Cohort '96	1996/1997	June 2002
Cohort '97	1997/1998	June 2003
Cohort '98	1998/1999	June 2004

*Whether students in the cohort year '91 were indeed in grade eight for the first time could not be verified in this data set. The graduation rate of this cohort year will be, therefore, inflated.

Note C: Defining Aboriginal Students

Aboriginal students are approximately 10% of the British Columbia kindergarten to grade 12 public school student population. A distinction can be made between Aboriginal and non-Aboriginal students in the School Retention File. Students who had *ever* identified themselves as "Aboriginal" on the 1701 Student Data Collection (a yearly school census form collected by the British Columbia Ministry of Education) during their school careers were considered Aboriginal for the purpose of this analysis. This may underrepresent students who may otherwise consider themselves "Aboriginal."

Note D: Defining Band Status Students

The education of Status, On-Reserve students attending British Columbia public schools is partially funded through the federal government. For this reason, the files of students receiving such funding are identified with a funding code, and more recently a code indicating with which of the 198 Bands in British Columbia these students are affiliated.

Students who are funded in this manner one year may not be in other years of their school careers. Students may have moved off-reserve, or there may be other reasons the federal government funding was not applied for, or to, these students. Students who had *ever* been funded as On-Reserve, Status Indian students in their school careers were considered "Band" for the purpose of this analysis. Band students, defined in this manner, comprise approximately 30% of the Aboriginal students.

Students may not necessarily be identified as Band students through each year of their school careers. In any given school year 30% of the students who are identified with Bands at some point in their school career *will be not coded as Band students for this particular year.* This means interpretation of the school outcomes associated with particular Bands must be treated with caution. The influence of students who have been funded as Band students inconsistently over time to specific graduation rates is unknown. For this reason, *only the range* of Band graduation rates is addressed in this report.

Note E: Defining Attrition

Attrition is defined as the loss to the cohort number that occurs when students who were once enrolled in grade eight drop out or move from the British Columbia school system. Attrition rates were calculated by determining what proportion of students were no longer in the British Columbia system by the senior year of high school. (Students who had moved to independent schools, alternate programs and correspondence were still considered *in* the system.) It is unknown how many of the students no longer in the British Columbia system had migrated to other provinces, as opposed to leaving school. It should also be noted that many students who drop out may *eventually* return to and complete education programs after their peers have graduated.. However, for the purposes of this analysis, students who leave and do not return within six years of enrolling in grade eight are considered to have left the k-12 school system.

Note F: Notes on Students who Remain in High School for Six Years

The information regarding the senior year of a cohort (as defined by the *5th year* after beginning grade eight) was aggregated and merged to the school census in order to investigate graduation rates. Because this year typically is the grade 12 year for students, this seemed reasonable. However, because information regarding students who remain in school for a sixth year is included here, it is conceivable that some of these students completed their 6th year at a *new* school. Due to this possibility, there will be an unknown degree of error associated with describing a school in terms of the cohort enrolled at the school during their fifth year.

Note G: Defining School Cohort Completion (or Graduation) Rates

Graduation is defined as a six-year completion rate in this analysis. (The terms, though not strictly synonymous, may be used interchangeably in this report.) As described above, upon entry to grade eight, students are provided six years to complete high school. Students who finish before six years are counted in calculating the school graduation rate. Students, who do graduate, but take longer than six years, are *not* counted in the school's graduation rate.

Note H: Notes on Secondary Ungraded

"Secondary Ungraded" is a school program categorization where students are no longer in the regular graded program. In other words, these students are not considered to be in a program associated with a grade level (grade 8, 9, 10, 11 or 12). Practices regarding which students are categorized in this manner and the individualized education programs they receive are at the

discretion of the school districts. Practices and rates of this categorization vary widely across the school districts.

Note I: Notes on School Re-Structure in British Columbia

As student cohorts progress through grades over time, the grade structures of the schools in which they are enrolled also can change – sometimes radically – over the same time. Indications on the current grade structure of schools are by no means a reliable way to determine how schools may have been structured *in the past* or during the years a given cohort was enrolled in the school.

Nearly every school district faces declining student enrolment. Over one hundred schools have been closed in recent years in the province. (Conversely schools have opened in a few locations.) School boards frequently restructure schools to make efficient use of their resources. In some districts a move toward middle schools is made as a progressive effort to offer unique educational advantages for students in this age group. The changing nature of many school structures often means that each school year's cohort of students in the same location may not have equivalent experiences. The task of comparing cohorts to one another, and to previous cohorts, while acknowledging the changing school structures within districts and across the province is complex and uncertain.

Note J: Notes on School Change, School Choice, and Student Migration

The mobility of secondary students between high schools over their high school careers emerged as an important feature of the student-level data. A high degree of school change occurs throughout the high school years for a large proportion of Aboriginal students. Students who enter grade eight at one school are often enrolled at a different school five years later. The school may be across town or across the province. A student may have enrolled in several different high schools over time either within their school district, between school districts, or both. In order to investigate the relationship between student mobility and school completion for individual students *and* for schools, *two* sorts of mobility characteristics were derived from examination of student school histories and school census information:

(1) Number of School Changes (grades 8-12)

(2) Location of Changes

Note K: Notes on Students who Experience No School Change

Many students remain in the same school for their high school careers. There is no ambiguity regarding this categorization. Students who experience no school change are enrolled typically in secondary (grade 8-12) schools; there are a handful of British Columbia schools with other grade configurations (grades k-12 for example). Half of the school districts in British Columbia are configured solely with secondary schools (grades 8-12).

Note L: Notes on School Choice

Differences among the school districts in British Columbia play a role in the percentage of students who change high schools within a district. There are locations in the provinces where in-district change is not likely or possible due to the limited number of high schools in the district or the geographic separation of small population centres. In other districts, choice of high schools exists within the same town. For the most part, students who had changed schools once, not for school structure reasons, did so in population centres where choice of high schools existed. An unknown number (approximately 1%) of Aboriginal students moved once to a high school within the district, but in another population centre.

Between-district school change may occur in cases where student residence has changed *or* where students exercise school choice. In urban areas of the province, school choice between districts is an available option. For example, students in Burnaby may attend schools in Vancouver. Vancouver students may attend schools in West Vancouver. Existing policy on school catchments allows for students to attend any public school in British Columbia if room exists.

CHAPTER FOUR: AN OVERVIEW OF STUDENT-LEVEL OBSERVATIONS

Findings that emerged from analysis of school records of student-level data are presented in this chapter. Data were examined in order to determine broad school outcomes associated with Aboriginal students. Next, how Aboriginal students progress through high school grade levels was examined. These student-level findings inform the hypotheses that are formally tested in Chapter Six.

Theme One

Broad School Outcomes of Aboriginal Students

Observation 4.1: There is a increase in the numbers of Aboriginal students in British Columbia schools.

The number of Aboriginal students in the British Columbia public school is increasing. The causes of this increase in school enrollment numbers are likely due to a combination of factors. The birth rate of the Aboriginal population is increasing (Siggner, 2001). As well, students may have an increasing level of pride in Aboriginal heritage and therefore a greater willingness to identify as "Aboriginal" on the 1701 school student-census form. It should also be noted that the accuracy of data collection and data management at the British Columbia Ministry of Education has also become more sophisticated over this time. Another possibility is that, faced with increasingly scarce resources, school boards make greater efforts to encourage Aboriginal students to declare their Aboriginal identities to obtain the additional resources that school boards receive for Aboriginal students. The number of students in each Aboriginal Cohort year is indicated in Table 2.

Table 2: Aboriginal Cohort Numbers

Cohort	Aboriginal N=	Non-Aboriginal N=
Cohort '91	3335	37,393
Cohort '92	3100	35,433
Cohort '93	2935	36,025
Cohort '94	3287	36,040
Cohort '95	3502	36, 808
Cohort '96	3836	36,862
Cohort '97	4066	38,539
Cohort '98	4460	44,582

Because the Aboriginal Cohort '98 graduated most recently, is the largest cohort, and is the cohort the Ministry data set represents most completely, much of the analysis of this chapter is focused on this student group. The uncertainty of how many students in the school system could be Aboriginal (given the instability in self-declaration rates) creates a need to exercise caution in drawing year-to-year comparisons. Issues associated with the construction of data will influence the accuracy of the cohort numbers preceding the '98 group.

Observation 4.2: The Aboriginal cohort graduation rates has increased over time.

Aboriginal students graduate in much lower proportions than non-Aboriginal students. The graduation rate of British Columbia students province-wide is typically reported by the Ministry of Education to be 82%. Aboriginal graduation rates are typically about half that high – reported at approximately 42%. The Table 3 below indicates the six-year school completion rate of each Aboriginal cohort in this study.

Table 3: Six-Year Completion Rates of Aboriginal Cohorts

Cohort	N=	6-year completion rate
Aboriginal Cohort '91	3335	27%
Aboriginal Cohort '92	3100	33%
Aboriginal Cohort '93	2935	35%
Aboriginal Cohort '94	3287	35%
Aboriginal Cohort '95	3502	38%
Aboriginal Cohort '96	3836	38%
Aboriginal Cohort '97	4066	40%
Aboriginal Cohort '98	4460	43%

There appears to be a positive trend in the completion rate of Aboriginal students over the eight years represented in these data. Again, it is unknown to what degree the change is an artifact of reporting changes of Aboriginal students. As well, changes in school, school district, and ministry-level retention and graduation policy have an unknown influence on the six-year graduation rates. The awareness, focus, and efforts of educators and members of the Aboriginal community to address the inequity in school outcomes of Aboriginal students may also be contributing to this positive trend.

It should also be noted that a similar increase (from 62% to 79% in these data) in the six-year completion rate of non-Aboriginal students has occurred in this same time period. Again, it is unknown to what degree data management practices, reporting practices, graduation policy, and efforts of educators account for change. However, Aboriginal graduation rates have historically been, and remain, far below non-Aboriginal rates.

Observation 4.3: Graduation rates of Band students have increased over time.

A distinction between those Aboriginal students who have resided on Indian reserves (Status Reserve Indians) and those Aboriginal students who have not occurs in this study. Band students comprise approximately 30% of the Aboriginal students in the data. The completion rates over eight years for both groups, Band and non-Band, of Aboriginal students are presented in Table 4.

Table 4: Completion Rates over Time of Band and Non-Band Aboriginal Students

Aboriginal Students	N=	6-Year Completion Rate	N=	6-Year Completion Rate
Cohort '91	811	24%	2524	29%
Cohort '92	867	23%	2233	36%
Cohort '93	885	25%	2050	39%
Cohort '94	986	23%	2301	38%
Cohort '95	1068	25%	2434	43%
Cohort '96	1167	26%	2669	43%
Cohort '97	1166	30%	2900	44%
Cohort '98	1246	31%	3212	48%

There appears to be a trend of increasing rates of school graduation in both Band and non-Band Aboriginal student groups. However, the six-year completion rates of Band students are consistently lower than the rates of their non-Band Aboriginal peers. It appears that the difference between the two rates has widened considerably from 1991 to 1998.

Observation 4.4: School attrition rates of Aboriginal students have declined over time.

Attrition from the public kindergarten – grade 12 system is a contributing factor in the low provincial Aboriginal six-year school completion rate. The attrition rate of Aboriginal students is higher than non-Aboriginal students. (The attrition rate for non-Aboriginal students was 13% in the 1991 Cohort year and had decreased to 5% in the 1998 Cohort year in this data.) The attrition rate for eight cohorts of Aboriginal students is presented in Table 5.

Table 5: Attrition Rates of Aboriginal Cohorts

Cohort	Attrition Rate
Aboriginal Cohort '91	27%
Aboriginal Cohort '92	22%
Aboriginal Cohort '93	17%
Aboriginal Cohort '94	18%
Aboriginal Cohort '95	17%
Aboriginal Cohort '96	16%
Aboriginal Cohort '97	15%
Aboriginal Cohort '98	13%

Though the percentage of students who drop out or move from the province is still high in the most recent cohort, there appears to be a dramatic decline over time in school attrition rates of Aboriginal students.

Observation 4.5: School attrition of Band students is currently equivalent to non-Band students.

The proportions of Band students, in contrast to non-Band students, who drop out of their cohorts is provided in Table 6.

Table 6: Attrition Rates of Non-Band and Band Students

	Attrition Rate (NonBand Students)	Attrition Rate (Band Students)
Cohort '91	33%	11%
Cohort '92	24%	16%
Cohort '93	18%	13%
Cohort '94	18%	18%
Cohort '95	16%	18%
Cohort '96	15%	18%
Cohort '97	15%	14%
Cohort '98	13%	13%

The dramatic decrease in the attrition rates documented in the Table 6 above generally seems associated with non-Band students. The attrition rate of Band students appears to have been

initially much lower than non-Band students, and to have remained more stable over time. The most recent and most complete data (the '98 Cohort year) indicate that attrition rates of both non-Band and Band students are equivalent. However, how the broad demographic shift in increased school retention rates, coupled with reporting changes, data management, and efforts of educators and community members to improve Aboriginal school retention has affected these figures is not known.

Theme Two

School Trajectories of Aboriginal Students

The school history, or grade progression, of individual Aboriginal students frequently is not orderly. When school histories are examined at the individual level, it is evident that the school careers of many Aboriginal students are marked with school interruption, grade retention, and/or program recategorization and other school-related disruption. Aboriginal students drop out of school temporarily (school interruption); repeat grades; are assigned to "Secondary Ungraded" status; are enrolled to different degrees in Aboriginal cultural, academic support or others programs; change schools, and/or change school districts. These events are quantified below.

The following analyses related to student school history are conducted with only the most recent and complete cohort data. Three phenomena emerge as significant features in the Aboriginal student population: grade-to-grade attrition, school trajectories and student mobility.

Observation 4.6: Cohort attrition by grade-level is greater at each grade level in the Aboriginal student population than the non-Aboriginal student population.

The rate of cohort loss at each grade level for the Aboriginal and non-Aboriginal students is presented in Table 7.

Table 7: Grade-to-Grade Attrition in '98 Cohort

Grade-to-Grade Cohort Attrition of '98 Cohort					
	Grade 8-9	Grade 9-10	Grade 10-11	Grade 11-12	Cumulative Loss
Aboriginal	3%	3%	3%	4%	13%
Non-Aboriginal	1%	1%	1%	2%	5%

Aboriginal and non-Aboriginal Cohort attrition follows a similar pattern at each high school grade level in the '98 Cohort. However Aboriginal students experience a greater rate of cohort loss at each grade level as well as a greater overall loss. Three percent of the cohort that enrolled in grade eight were lost to the system by grade nine. In a similar way, an additional 3% of the students who had enrolled in grade eight together were lost to the system by grade 10. The young age (grade eight students are 13-14 years old) at which some students leave the school system is also a concern.

Observation 4.7: Rates of school interruption are greater in the Aboriginal student population than the non-Aboriginal student population.

In contrast to students who permanently leave the British Columbia school system, some students are temporarily not enrolled in high school and then return in subsequent years. Aboriginal students are more likely to have interrupted school careers than non-Aboriginal students. (2% of the non-Aboriginal population interrupted high school in the '98 Cohort.) Table 8 presents information on the school interruption rates associated with Aboriginal students in the most recent and complete cohort year.

Table 8: School Interruption Rate of '98 Aboriginal Cohort:

Band and Non-Band Students

High School Interruption in the '98 Cohort	
Aboriginal	15%
Non-Aboriginal	2%

A high proportion (15%) of Aboriginal students have school careers that are interrupted either by dropping out of the system temporarily or by moving out of province temporarily. The rates of school interruption of Band and non-Band students are equivalent (given that Band students

comprise a third of the Aboriginal group). A very small proportion (8%) of these Aboriginal students completed school within six years.

Observation 4.8: Lower rates of Aboriginal students transition to grade levels than non-Aboriginal students.

The proportion of Aboriginal students in the high school system who advance from grade-to-grade is presented in Table 9.

Table 9: Grade-to-Grade '98 Cohort Transitions

Grade-to-Grade Transitions of the '98 Aboriginal Cohort					
	Grade 8-9	**Grade 9-10**	**Grade 10-11**	**Grade 11-12**	**Cumulative Loss**
Aboriginal	91%	82%	74%	60%	40%
Non-Aboriginal	98%	96%	93%	87%	13%

91% of the Aboriginal grade eight cohort progressed to grade nine the following school year. 82% of the cohort progressed to grade ten the following year. While some non-Aboriginal students fail to progress smoothly through high school grades, this is more prevalent in Aboriginal students. In other words, a higher proportion of Aboriginal students repeat grades or are placed in "ungraded" programs at each grade level.

Observation 4.9: Aboriginal students are categorized as "Secondary Ungraded" at higher rates than non-Aboriginal students.

The proportion of students categorized as "Secondary Ungraded" is provided in Table 10.

Table 10: Secondary Ungraded Categorization of '98 Cohort

Secondary Ungraded Status of the '98 Aboriginal Cohort		
Percent Aboriginal	11%	64% Non-Band
		36% Band

Aboriginal students are categorized as "Secondary Ungraded" at higher rates than non-Aboriginal students. In the 1998 Cohort year, 11% of Aboriginal students were categorized in this way (as opposed to less than 2% of non-Aboriginal students). Band and non-Band students are categorized in this way to an equivalent degree (given that 1/3 of the Aboriginal students are Band

students). Attrition rates of Aboriginal students categorized as Secondary Ungraded are high (16%) and completion rates are low (8%).

Observation 4.10: School programs that are constructed specifically to provide cultural and academic and other support to Aboriginal students are featured to different degrees in the school trajectories of non-Band and Band Aboriginal students.

The number of years students in the '98 Cohort were enrolled in programs designed explicitly to provide cultural, academic, and other support is presented in Table 11.

Table 11: Years in Aboriginal Cultural Courses of '98 Cohort

Years in Program	Non-Band	Band	Aboriginal
0	45.3%	11.4%	35.8%
1	16.8%	9.8%	14.8%
2	12.3%	12.5%	12.4%
3	9.4%	14.1%	10.7%
4	5.4%	13.8%	7.7%
5	5.0%	13.0%	7.2%
6	2.1%	10.3%	4.4%
7	2.0%	12.1%	4.8%
8	1.8%	3.0%	2.1%

Approximately one third of Aboriginal students *have not enrolled in a single year* of such courses. In particular, many non-Band students (45.3%) have not participated in the programs designed to provide cultural, academic, or other support for Aboriginal students. Those non-Band students who do participate in such programs do so for only a few years. In contrast, the distribution of Band students enrolled in the courses is more evenly distributed across years. Number of years enrolled in these courses does not appear to be related to graduation rate.

Observation 4.11: Many Aboriginal students experience school change and low completion rates

A high degree of school change occurs throughout the high school years for a large proportion of Aboriginal students. The Table 12 provides information on the completion rates and percentage of the '98 Aboriginal cohort associated with number of school changes students made in high school.

Table 12: Number of School Changes and Completion Rates in the '98 Aboriginal Cohort

Number of School Changes (High School Only)	Percentage of '98 Cohort	6-Year Completion Rate
No School Changes	31.3%	56.4%
1 School Change	36.6%	48.9%
2 School Changes	19.8%	28.1%
3 School Changes	9.7%	17.24%
4 School Changes	2.6%	11.3%

Less than a third of the Aboriginal Cohort experienced no school changes in high school. (In contrast, 73% of the non-Aboriginal students in the '98 cohort were in the no school change category.) The highest completion rate is associated with students who have *never* changed schools. The completion rate of students who change schools once during high school is similar. The pattern of lower completion rates associated with two, three, and four school changes is more evident.

Observation 4.12: Many Aboriginal students moving across school districts and within districts experience low completion rates.

Table 13 provides estimations on the percentage of the '98 Aboriginal cohort in terms of the above four categorizations of school moves. These categorizations represent the locations of the original school in comparison to the destination school (or schools).

Table 13: School Completion Rates and Location of School Change in '98 Aboriginal Cohort

'98 Aboriginal Cohort	Proportion	Completion Rate
No School Change	31.4%	56.8%
School Structure School Change	18%	58%
Within-District School Change	19.5%	28.2%
Between-District School Change	30.1%	29.8%

Approximately one third of the '98 Aboriginal cohort did not change schools. Fifty-seven percent of Aboriginal students who did not change schools completed school within six years. This is a much higher percentage than the overall 42% completion rate reported for Aboriginal students province-wide.

An estimated 18% of the '98 Aboriginal Cohort changed schools once due to school structure change. The completion rate of these students is comparable (at 58%) to Aboriginal students who had never changed schools.

An estimated 20% of the '98 Aboriginal cohort were categorized as having experienced within-district school change. The completion rate of these students is substantially lower than their peers who remain in the district and do not change schools, or alternately change schools due to grade progression. Students who change schools within district in this cohort had a 28% completion rate. Approximately a third of the province's '98 Aboriginal cohort changed schools between districts. These Aboriginal students' six-year completion rate is nearly identical to the completion rate of students who change schools within districts. 30% of these Aboriginal students complete school.

Conclusion

The number of Aboriginal students enrolling in British Columbia public schools and identifying themselves as Aboriginal students is increasing. While there is evidence the graduation rates of Aboriginal students is also on the increase, and attrition rates are decreasing, the data provided in this analysis do not allow for firm conclusions to be made regarding how much improvement has occurred over time. Notably however, it appears that over time Band students have lower completion rates than their non-Band Aboriginal peers.

Analysis of student histories confirms that numerous differences exist in school careers of Aboriginal students and non-Aboriginal students. For example, there is a higher rate of school interruption and grade recategorization, and lower rates of grade-to-grade progression. The proportion of Aboriginal students who are mobile across high schools is substantial. Mobile Aboriginal students also emerged as a population vulnerable to low completion rates.

CHAPTER FIVE: AN OVERVIEW OF SCHOOL-LEVEL OBSERVATIONS

The first part of this chapter establishes the range of community differences and the variability in Aboriginal graduation rates associated with schools. A preliminary examination of whether change in graduation rates at schools has occurred is also presented. Next, three factors related to school context are examined: (1) socioeconomic indicators, (2) proportion of Band students in schools, and (3) proportion of highly mobile Aboriginal students in schools. These school-level observations inform the hypothesis that is formally tested in Chapter Six.

PART ONE

The Range of Differences in School Context across British Columbia

Extensive differences exist in the geographic, community, and school contexts of high schools across British Columbia. For example many schools are located in large urban centres in the Lower Mainland of British Columbia (such as Vancouver, Victoria, and New Westminster). Others are located in northern or otherwise remote areas of the province (for example, the Queen Charlotte Islands, Dawson Creek, and Ucluelet.) The neighbourhoods where the schools are situated may be well educated and affluent (Fort Nelson and Chetwynd) and the opposite conditions can prevail (Hazelton, Courtenay, Vancouver). There are small schools with just over one hundred students enrolled and large schools where several thousand attend. Unemployment rates vary in the locations of these schools from 25% to 4%. Some schools are 8-12 schools; others are 11-12 schools. The proportion of Aboriginal students ranges from 3% to schools where Aboriginal students outnumber non-Aboriginal students. Many major population centres across the province (such as Kelowna, Prince George, and Nanaimo) are large enough to have more than one high school where sizable populations of Aboriginal students are enrolled. Given the wide range of school contexts and that schools are nested within a wide range of community contexts, the exercise of drawing comparisons between schools in order to identify patterns and possibly exemplars of Aboriginal graduation success is intricate and imperfect.

Observation 5.1: There is a high degree of variability in graduation rates of both Aboriginal and non-Aboriginal students across British Columbia schools.

Graduation rates for both Aboriginal and non-Aboriginal student groups vary widely at the school-level. In Figure 1 British Columbia school locations are arranged in order of lowest pooled Aboriginal graduation rates over time to highest. Patterns are difficult to discern in this overview. It appears there is a tendency toward higher Aboriginal completion rates to be associated with higher non-Aboriginal completion rates. However, this relationship is far from obvious.

Observation 5.2: There are schools in British Columbia where the Aboriginal graduation rate is atypical.

The vertical bars on Figure 2 delineate the range of schools 1 standard deviation above or below the pooled graduation rate mean. Schools beyond those bars have pooled graduation rates that are comparatively unusually high or low among these schools. Locations where pooled Aboriginal graduation rates are atypically low or high are featured in Figure 3. (The schools have been identified by school name in Figure 4.) There is a wide range of graduation rates of Aboriginal students across British Columbia when data are aggregated to the school level.

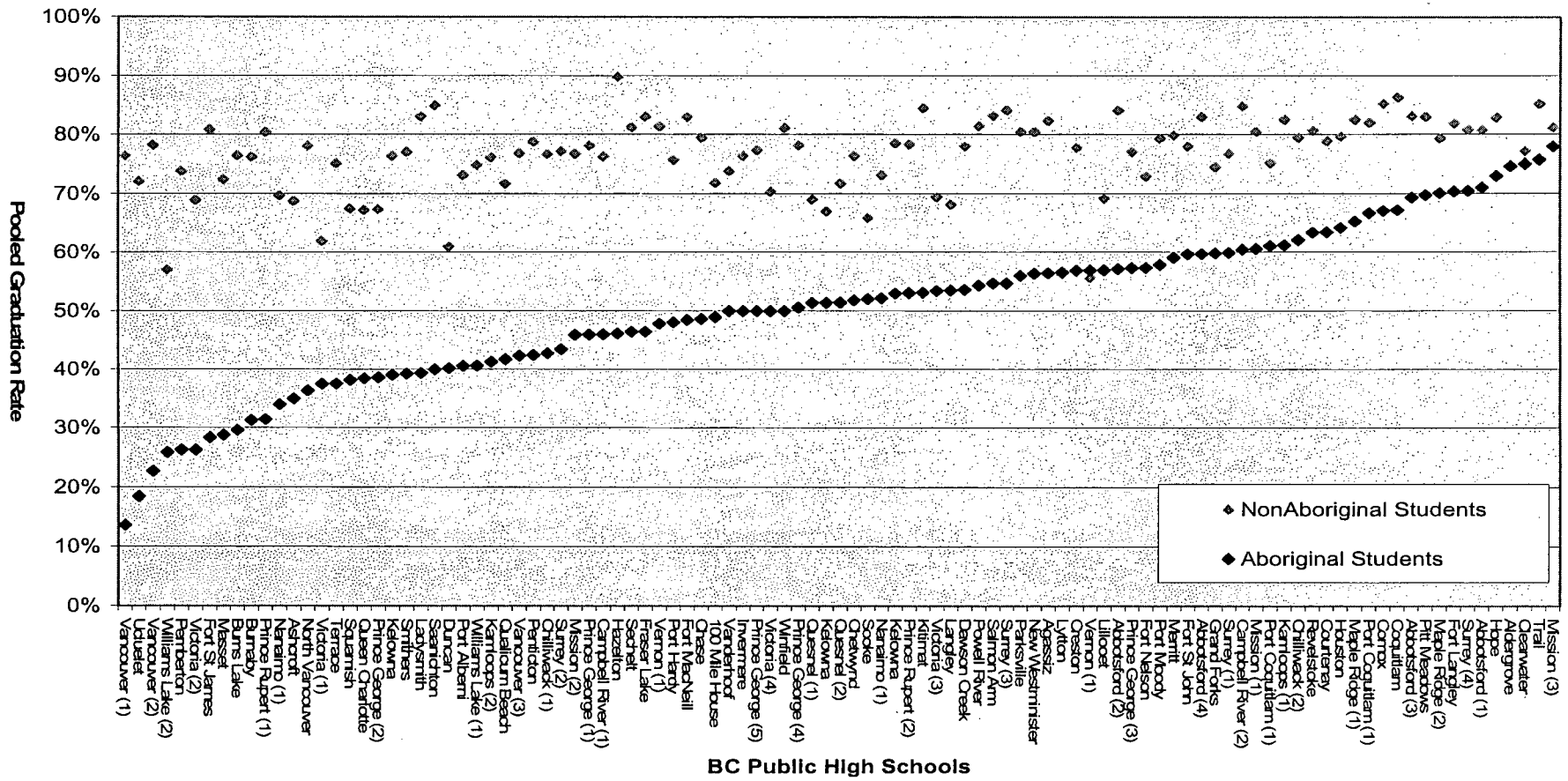

FIGURE 1: An Overview of Graduation Rates of Aboriginal and Non-Aboriginal Students in 103 British Columbia Public High Schools

Communities with more than one high school included here will have a number in brackets indicating which school is represented.

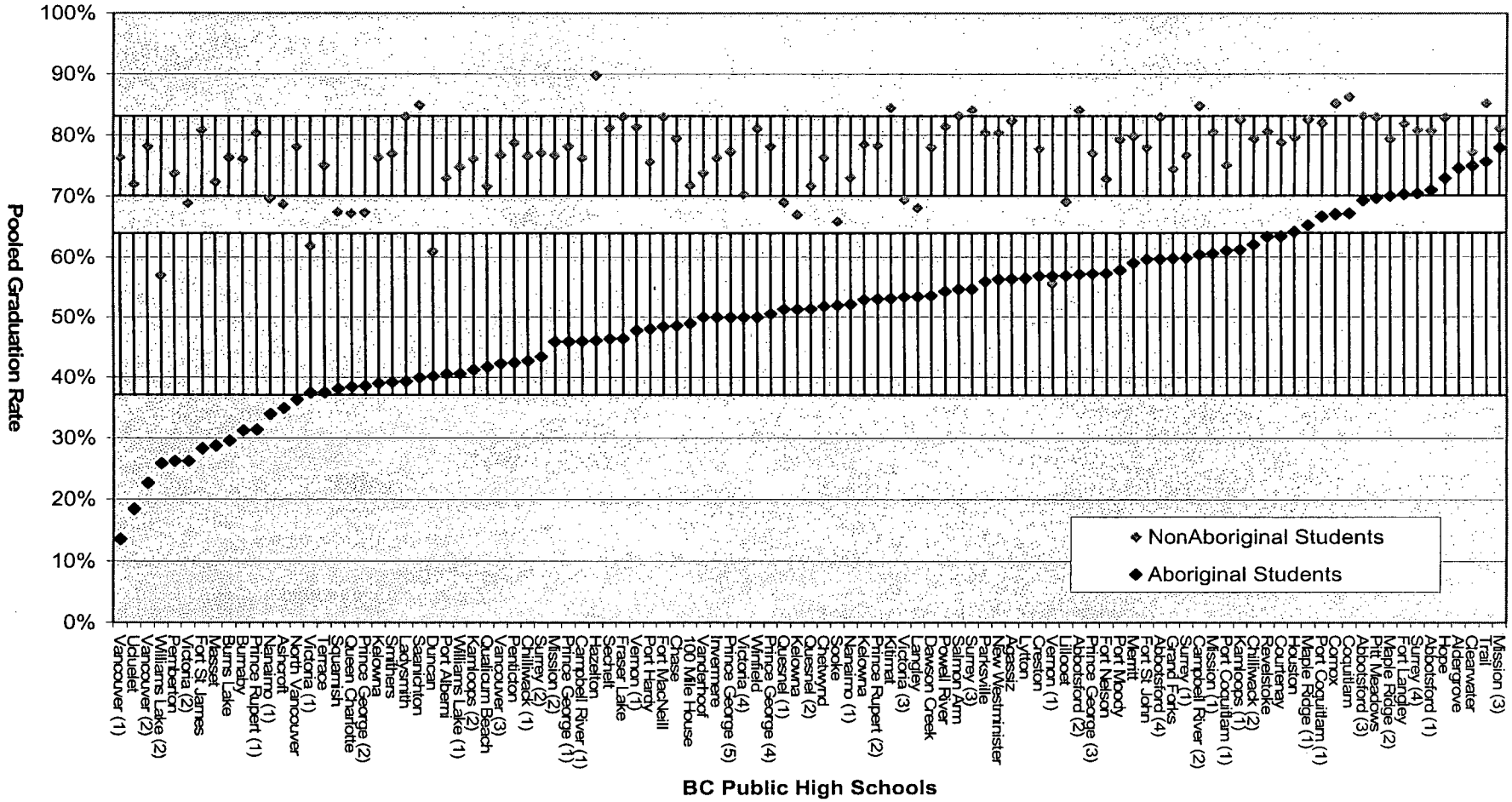

FIGURE 2: An Overview of Graduation Rates and Schools One Standard Deviation Above or Below the Student-Group Mean

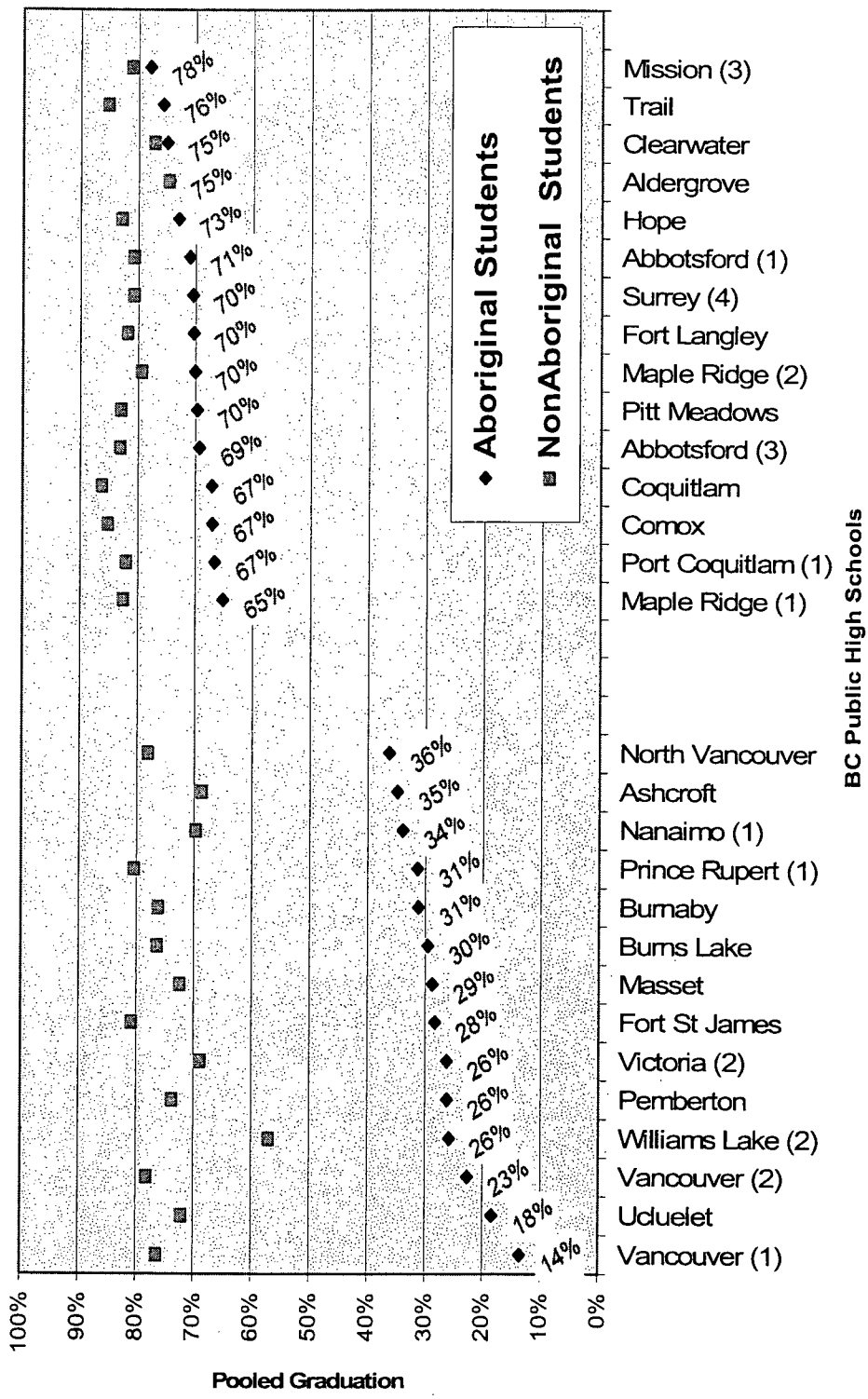

FIGURE 3: Locations of Atypical Aboriginal Completion (Population Centre)

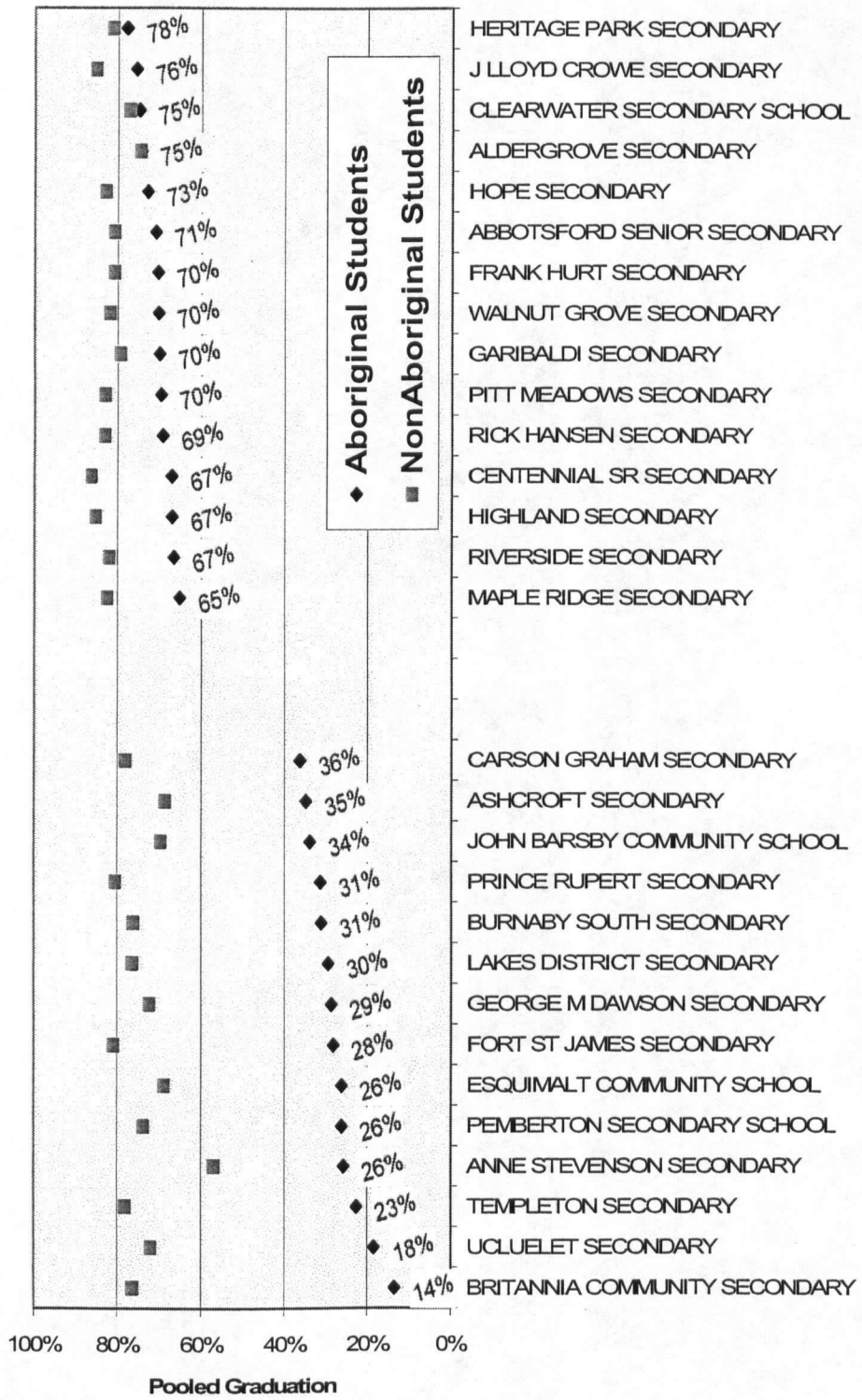

FIGURE 4: Locations of Aboriginal Graduation Outliers (School Name)

PART TWO

Trends In Aboriginal Cohort Completion At The School-Level

Observation 5.3: There is a high degree of year-to-year variability in Aboriginal cohort completion at the school-level.

Figures 1 to 4 reveal dramatic differences in *pooled* Aboriginal completion rates at the school level across time, across communities, and among schools within the same community. The Aboriginal graduation rates also differ from year to year at these same locations and schools. A high degree of year-to-year variability in these data exist within the schools in rates of Aboriginal cohort completion. Figure 5 illustrates the variability of Aboriginal graduation over time at specific schools.

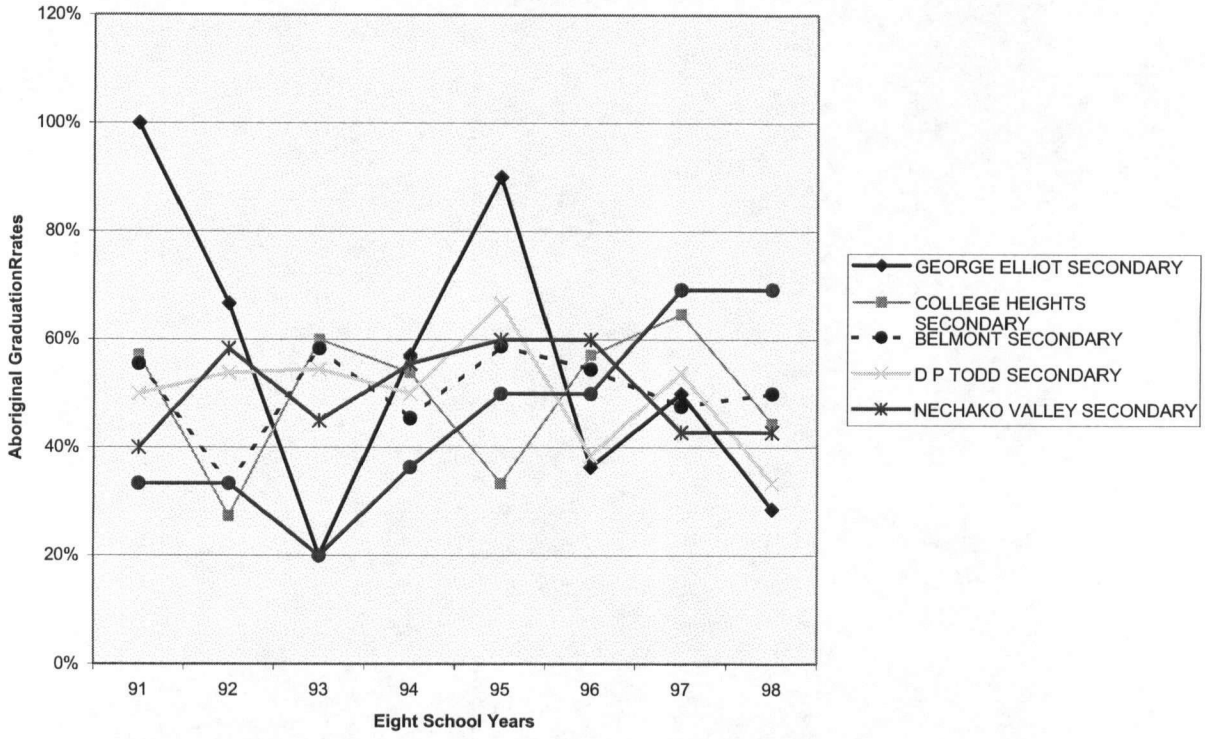

FIGURE 5: Year-to-Year Variability in Aboriginal Graduation

In this illustration, the year-to-year graduation rates of five schools with average *pooled* Aboriginal graduation rates are presented. While it appears that over time a trend of higher completion rates occurs at the school level this is by no means a consistent or obvious year-to-year event. This same pattern of variability from year to year can be observed in *nearly all* schools

regardless of whether those schools are associated with higher or lower pooled rates. This creates difficulty in making predictions of Aboriginal completion by examining year-to-year cohort results within schools. Further, school-to-school comparisons over time are also difficult.

Observation 5.4: There is variability in the rate of change over time in the Aboriginal cohort graduation rate across schools.

Figure 6 represents trends over time evident in these data for Aboriginal cohort completion across high schools in British Columbia over eight years.

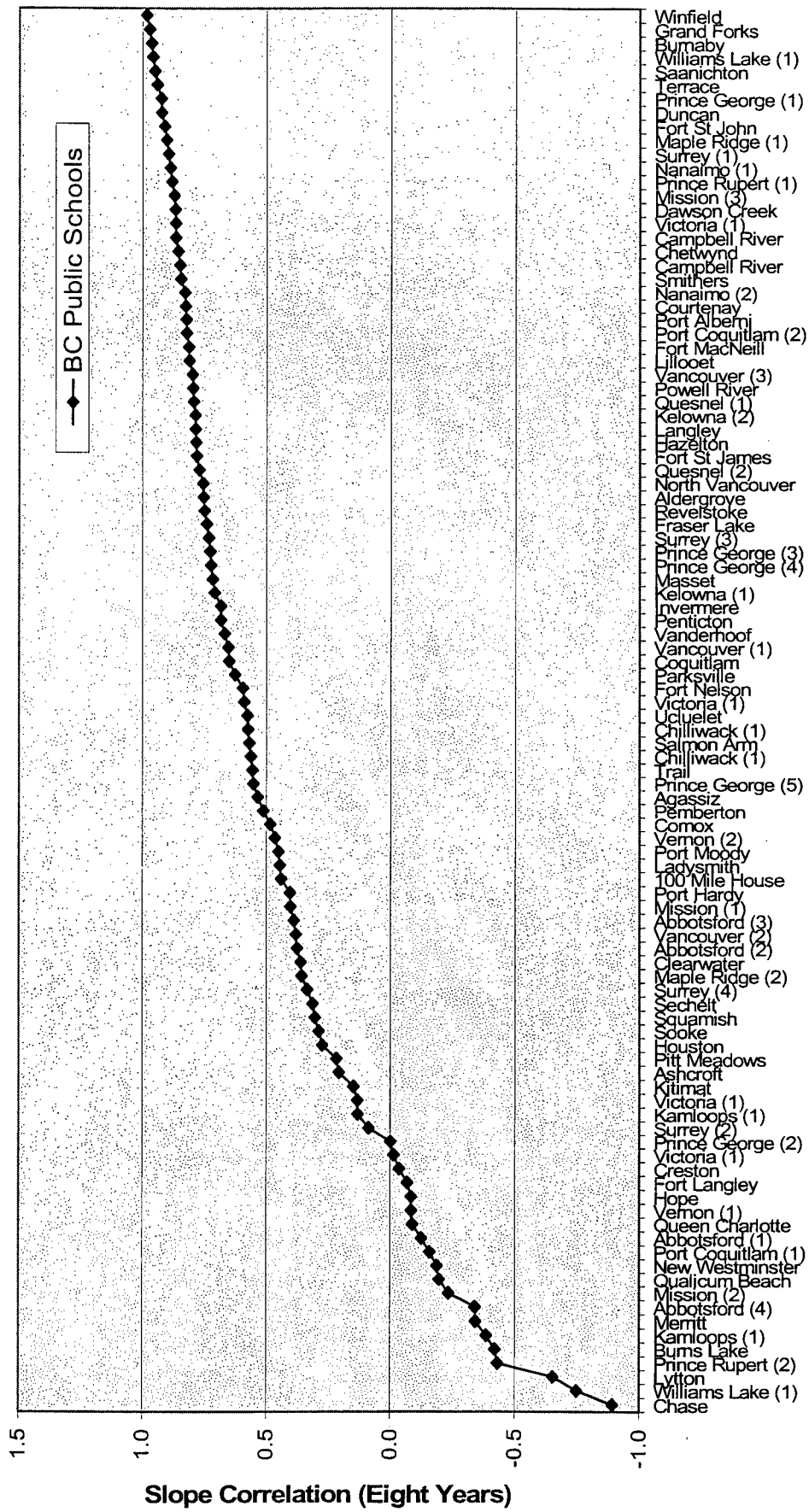

FIGURE 6: Positive and Negative Trends in Aboriginal Graduation

Schools are arranged from highest negative change to highest positive change. The scale on the left is the correlation coefficient between a school's graduation rate and the corresponding calender year, i.e. this is a measure of how constant a trend is over time. (The data points closest to -1 or +1 represent schools where the trend is highly consistent over eight years.) In most schools positive change (locations where data points are above 0) appears to have occurred. In a minority of schools, negative change (locations where data points are below 0) has occurred.

Observation 5.5: There are schools where atypical trends in Aboriginal cohort completion have occurred

There are locations in which unusually high or low degrees of change in Aboriginal school completion over time had occurred. These atypical schools are featured in Figure 7.

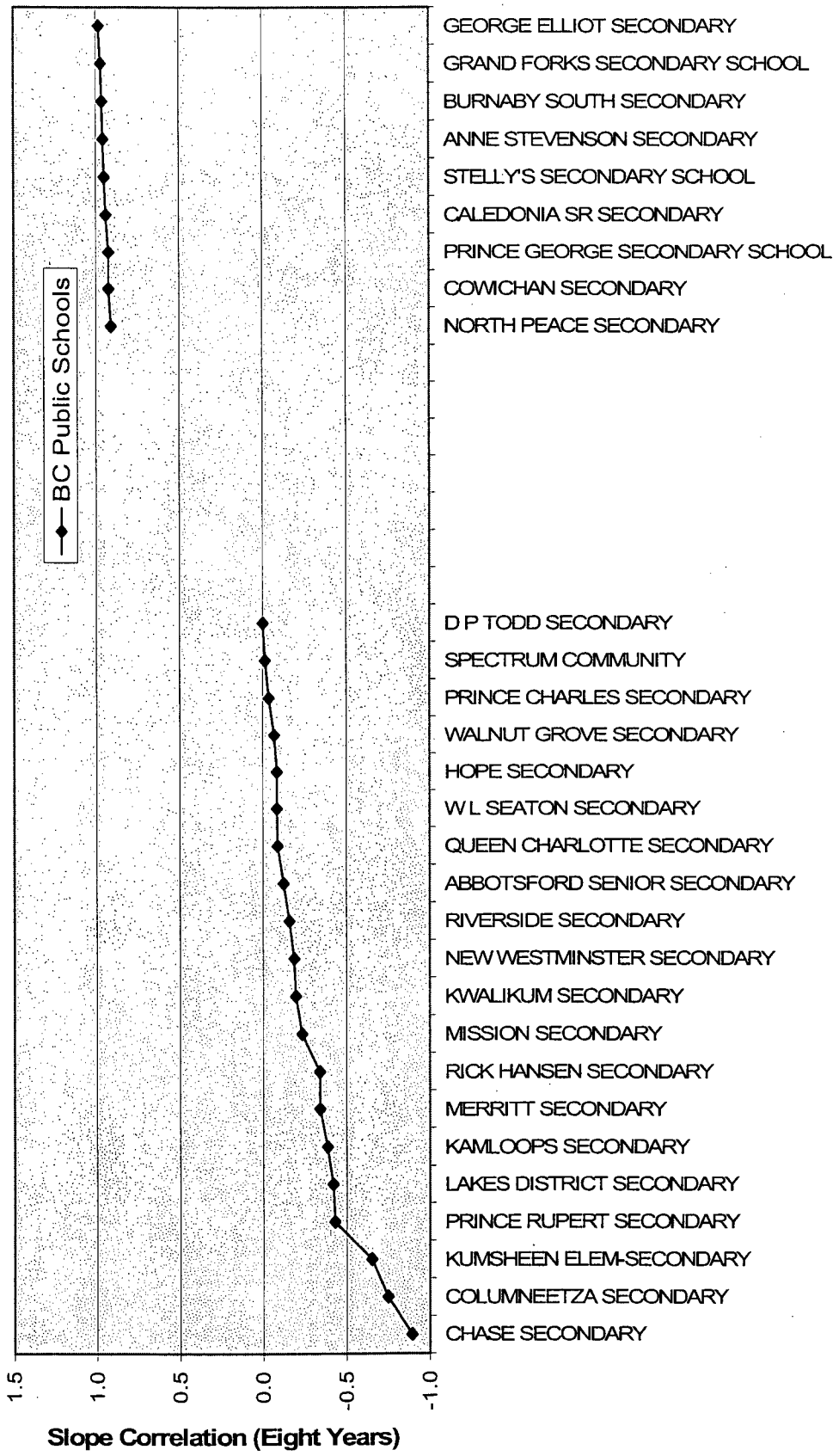

FIGURE 7: Outliers of Negative and Positive Change in Aboriginal Graduation Rates

While this component of the data exploration is somewhat speculative, it is does provide a demonstration of how the dimension of time adds complexity to representing and understanding schools' graduation rates. Cohort completion rates in schools clearly vary widely over time and over schools. Preliminary observations regarding the variability of community-level socioeconomic conditions and their potential interaction with Aboriginal cohort completion rates at schools is presented below.

PART THREE

Socioeconomic Conditions and Community Contexts across British Columbia Schools

It is widely accepted in research and educational literature that a fundamental relationship exists between socioeconomic status and other variables associated with well being and the school attainment of individuals and student populations. The social and economic conditions of communities in which schools are "nested" vary widely across British Columbia.

Observation 5.6: Community level socioeconomic conditions are related to cohort completion rates at the school-level, particularly for Aboriginal cohorts.

The existence of a relationship between cohort graduation rates and the socioeconomic contexts of school neighbourhoods was investigated with Pearson correlation coefficients.

Table 14: Correlation of Non-Aboriginal and Aboriginal Graduation Rates to Statistics Canada Indicators

	M	SD	Education Attainment Less High School	Average Income	Proportion Families Less 20K	Unemployment Rate
Non-Aboriginal Graduation	77%	7%	-0.04	0.19	-0.04	-0.08
Aboriginal Graduation	51%	3%	-0.04	0.18	-0.29**	-0.16

**Significant at the 0.01 level

Very modest relationships exist between the graduation rates of *both* Aboriginal and non-Aboriginal student groups and the proportion of the community population with less than high school attainment. The correlation of *both* groups' graduation rates (0.19 non-Aboriginal; 0.18 Aboriginal) to the income level of school neighbourhoods is more substantial.

However, the strength of the relationship to school graduation rate between the proportion of families with less than $20,000 annual income and the unemployment rate *differs* for the two student populations. These variables are modestly correlated to non-Aboriginal graduation; and more substantially and significantly related to Aboriginal graduation. One possible explanation of this difference is that Aboriginal students are less evenly distributed across the range of these socioeconomic status conditions. These students may be pooled in communities where low family income and high unemployment rates are likely to prevail.

Regression analysis was conducted to determine the extent these four Statistics Canada socioeconomic status variables together accounted for the variability in both the non-Aboriginal and the Aboriginal pooled graduation rates (see Table 14). Of the four Statistics Canada Census variables, only the proportion of families earning less than $20,000 within a two-mile radius of the school was significantly associated with graduation (r = -0.4, significant at the.05 level), and only with graduation of the non-Aboriginal student group.

Table 15: Explained Variability of Graduation Rates and Four Statistics Canada Community Socioeconomic Status Indicators

Student Population	Explained Variance	Significance
Non-Aboriginal Graduation	R^2 = 0.012	0.279
Aboriginal Graduation	R^2 = 0.062	0.038*

*Significant at the 0.05 level

These four community-level socioeconomic status variables account for a modest 6% of the variability of pooled Aboriginal graduation rates. However, that there is a relationship between broad community socioeconomic conditions and school completion rates of Aboriginal students is

supported. Where family income was low and unemployment high in school neighbourhoods, Aboriginal completion rates were low.

Observation 5.7: Social deprivation indicators are related to cohort completion rates at the school-level, particularly for Aboriginal cohorts.

The existence of a relationship between cohort graduation rates and the socioeconomic contexts of school neighbourhoods was investigated with Pearson correlation coefficients. The Social Deprivation Index (SDI) provided information very broadly associated with the social and economic health of Aboriginal populations in community/regions in which schools are nested. Intercorrelation of this index rating for both Aboriginal and non-Aboriginal communities and student completion rates was calculated (see Table 16).

Table 16: Intercorrelation of Graduation Rates and Social Deprivation Index (SDI)

	M	SD	Non-Aboriginal Graduation	Aboriginal Graduation	Non-Aboriginal Community SDI	Aboriginal Community SDI
Non-Aboriginal Graduation	77%	7%				
Aboriginal Graduation	51%	13%	0.363**			
Non-Aboriginal Community SDI	103	11	0.092	-0.123		
Aboriginal Community SDI	173	44	-0.027	-0.330**	0.302**	

**Significant at the 0.01 level

The Social Deprivation Index ratings of Aboriginal communities ranged widely (from 82 to 294). The mean Social Deprivation Index rating of Aboriginal communities across British Columbia is substantially higher than that of non-Aboriginal communities. In other words, social deprivation is higher for Aboriginal communities. There are numerous examples of communities where the

Aboriginal Social Deprivation Index is *extremely high* (one or two standard deviations above the mean combined Social Deprivation Index rating). Vancouver, Vanderhoof and Fort St. John are examples. At the same time, there are examples of communities where the Social Deprivation Index ratings of both Aboriginal and non-Aboriginal communities are equivalent (Lillooet, Chetwynd, Nanaimo for example).

Graduation rates of both populations are significantly interrelated with one another (0.363). In a similar way, the Social Deprivation Index ratings of both populations appear to be interrelated (0.302). This may confirm that populations and schools are nested within and interact with community conditions.

However, the extent of Social Deprivation Index relationships to school outcomes *differs* by population. Negligible relationships exist between Social Deprivation Index ratings and non-Aboriginal graduation (0.092). In comparison, the relationship of Aboriginal graduation to Social Deprivation Index is more evident and significant (-0.330).

Given that Aboriginal Social Deprivation Index ratings are on average far higher than non-Aboriginal community ratings, the prevailing socioeconomic status of communities Aboriginal students are located within may be a relevant negative influence on school graduation rates.

Observation 5.8: Social deprivation is negatively, but not consistently associated with Aboriginal cohort school graduation.

The relationship that exists between Social Deprivation Index ranking and Aboriginal cohort school completion may be demonstrated by plotting the pooled Aboriginal graduation rates against Aboriginal community Social Deprivation Index (Figure 8).

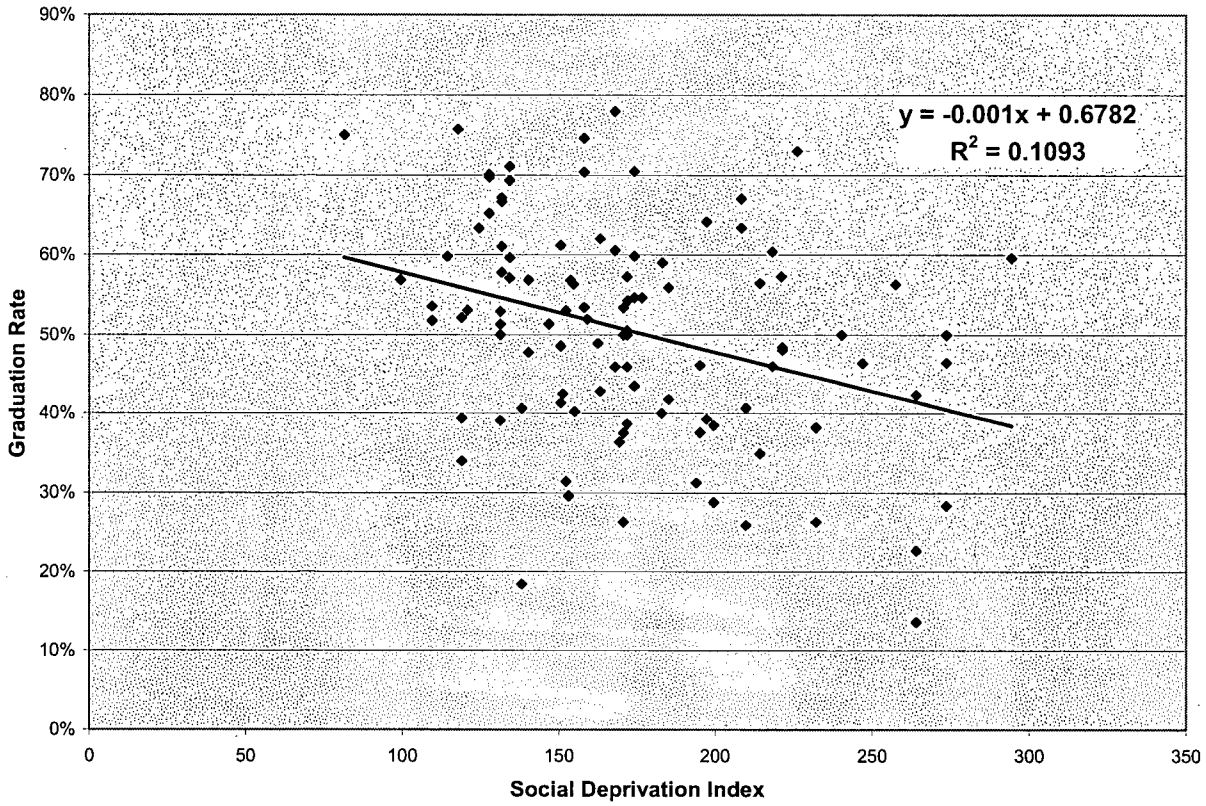

FIGURE 8: Scatter plot of Aboriginal Community Social Deprivation Index and Aboriginal Graduation

The Social Deprivation Index can account for 11% of the variability in pooled Aboriginal cohort graduation rates at the school-level. However, this relationship is not consistent. The Aboriginal graduation rate of some schools, no matter where they fall along the Aboriginal community Social Deprivation Index continuum, may be atypical. In other words, high and low Aboriginal graduation rates are widely distributed across both high and low Aboriginal Social Deprivation Index ratings. Vertical bars (representing standard deviation) are used to demonstrate this in the Figure 9.

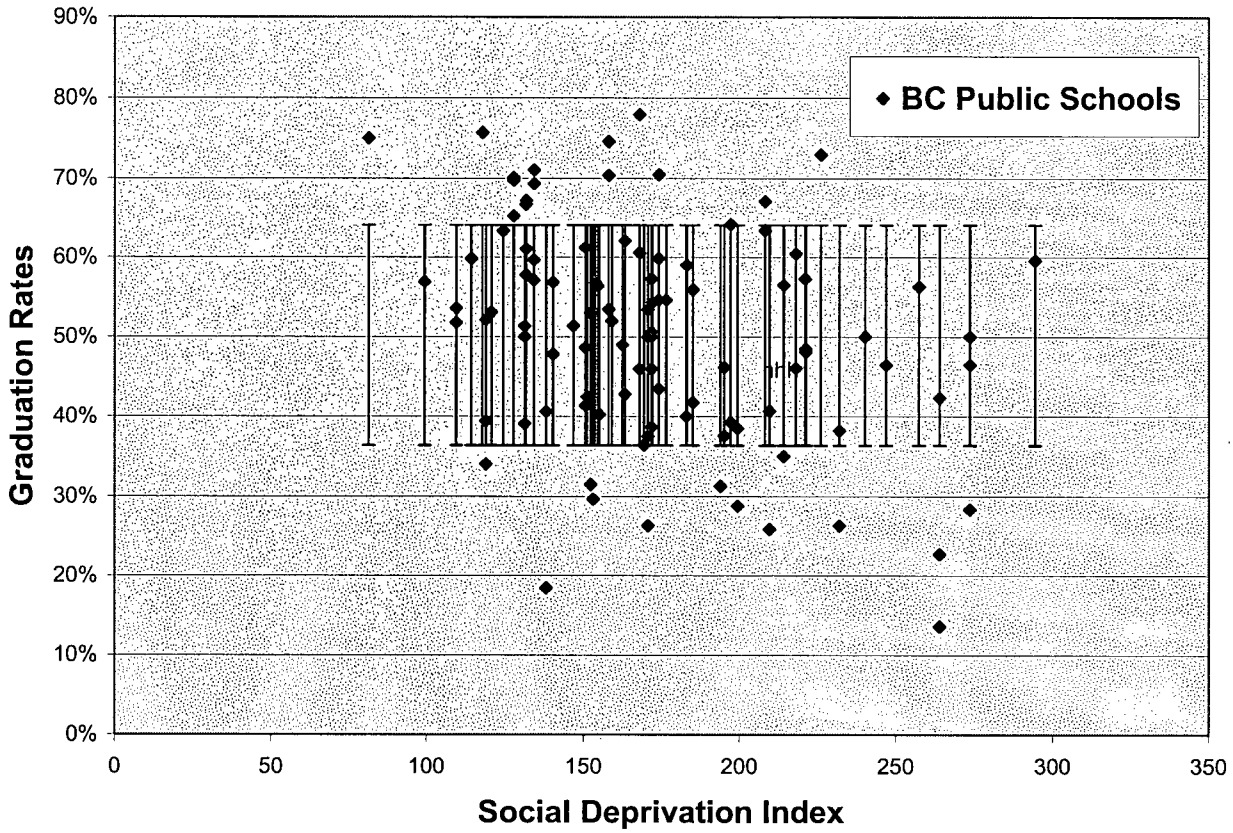

FIGURE 9: Outliers of Aboriginal Graduation Rates and Aboriginal Community Social Deprivation Index

Data points that lay beyond the vertical bars in Figure 9 represent schools that are one standard deviation above or below the pooled mean Aboriginal graduation rate. Figure 10 highlights that outlier schools exist and specifies their Aboriginal cohort graduation rates.

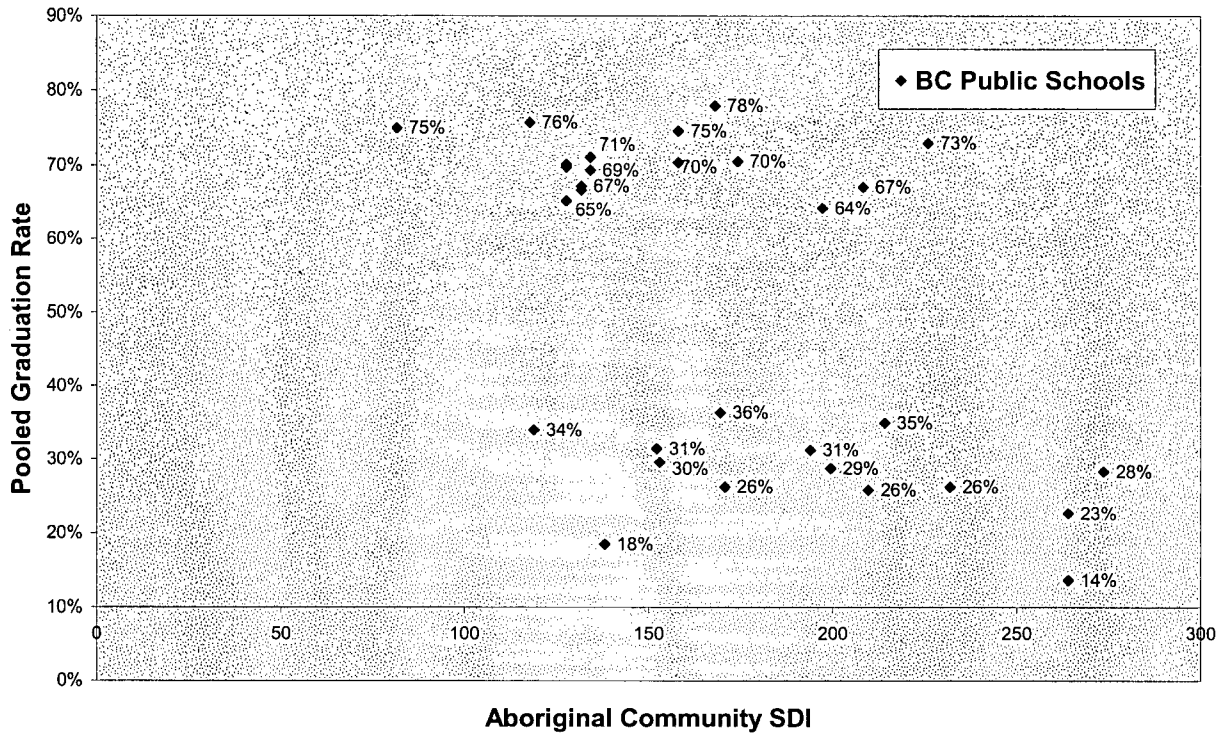

FIGURE 10: Outlier Schools Plotted Along the Aboriginal Community Social Deprivation Index Continuum

Outlier schools – both schools where unusually high *and* unusually low graduation rates occur – exist in communities of socioeconomic status conditions that *range* from moderate social deprivation to extreme social deprivation.

Implications of Variability in Aboriginal Cohort Performance at the School-Level

Although the two sources of community socioeconomic status information examined here (Statistics Canada and CommunityLink Social Deprivation Index) are imprecisely associated to students and schools, socioeconomic factors may play a perceptible role in school outcomes of Aboriginal students. However the dynamics of this are not readily apparent given the wide variability of Aboriginal graduation rates in communities facing similar social conditions. It is not apparent to

what extent features associated *strictly* to schools such as school staff, curriculum or educational policies play an ameliorating role. A multi-level model (or Hierarchical Linear Model) of how socioeconomic status measures interact with other dimensions of community and school context will be constructed to more fully understand these relationships in Chapter Six.

PART FOUR

Proportion of Band Students in Schools

The proportion of Band students (as opposed to non-Band students) in school cohorts emerged as an important feature of school context.

Analysis of student-level data indicates that the school completion rates of Band students, as opposed to non-Band Aboriginal students, are consistently and considerably lower over time in British Columbia public schools. For example, in the most recent '98 cohort, Band students had a completion rate of 31%; non-Band students had a completion rate of 43%. Band graduation rates do not appear to have changed appreciatively over time at the school level. The interaction of the proportion of Band status students at the school level and school graduation rates was investigated.

Observation 5.9: Band size and rates of school completion of Band students is variable across British Columbia.

Students in 151 different Bands are enrolled in British Columbia public schools. Fifty-one of these Bands typically have only one or two students in a given school-year cohort. Other Bands have more sizable student populations. For example, there are 41 Bands where eight or more students entered grade eight together in the most recent '98 cohort year. The graduation rate of students affiliated with these 41 Bands ranges from 0% to 67%.

While these differences are of great interest, Bands are not the unit of analysis in this study. Student-level data were aggregated to the school level (as opposed to the Band level) for analysis.

In British Columbia, 37 public high schools have enrolments of eight or more Band students in the '98 cohort in their senior year of fifth year of high school. However, this does not mean that Band students at a given school are affiliated with the *same* Band. Students from different Bands may

be enrolled in a high school. For example, the high school in Lillooet (a small somewhat remote community) has students from twelve different Bands enrolled. Also, given the degree of school change and student migration, students affiliated with a given Band may be dispersed in different schools across town or across the province. For example, the Squamish Band (located within another small population centre) had affiliated students enrolled in nine different high schools in the '98 cohort year.

Observation 5.10: Differences exist in the completion rates of Band students and non-Band students at the same school.

The school graduation rates of Band students enrolled in 37 high schools are compared to non-Band Aboriginal students in Figure 11.

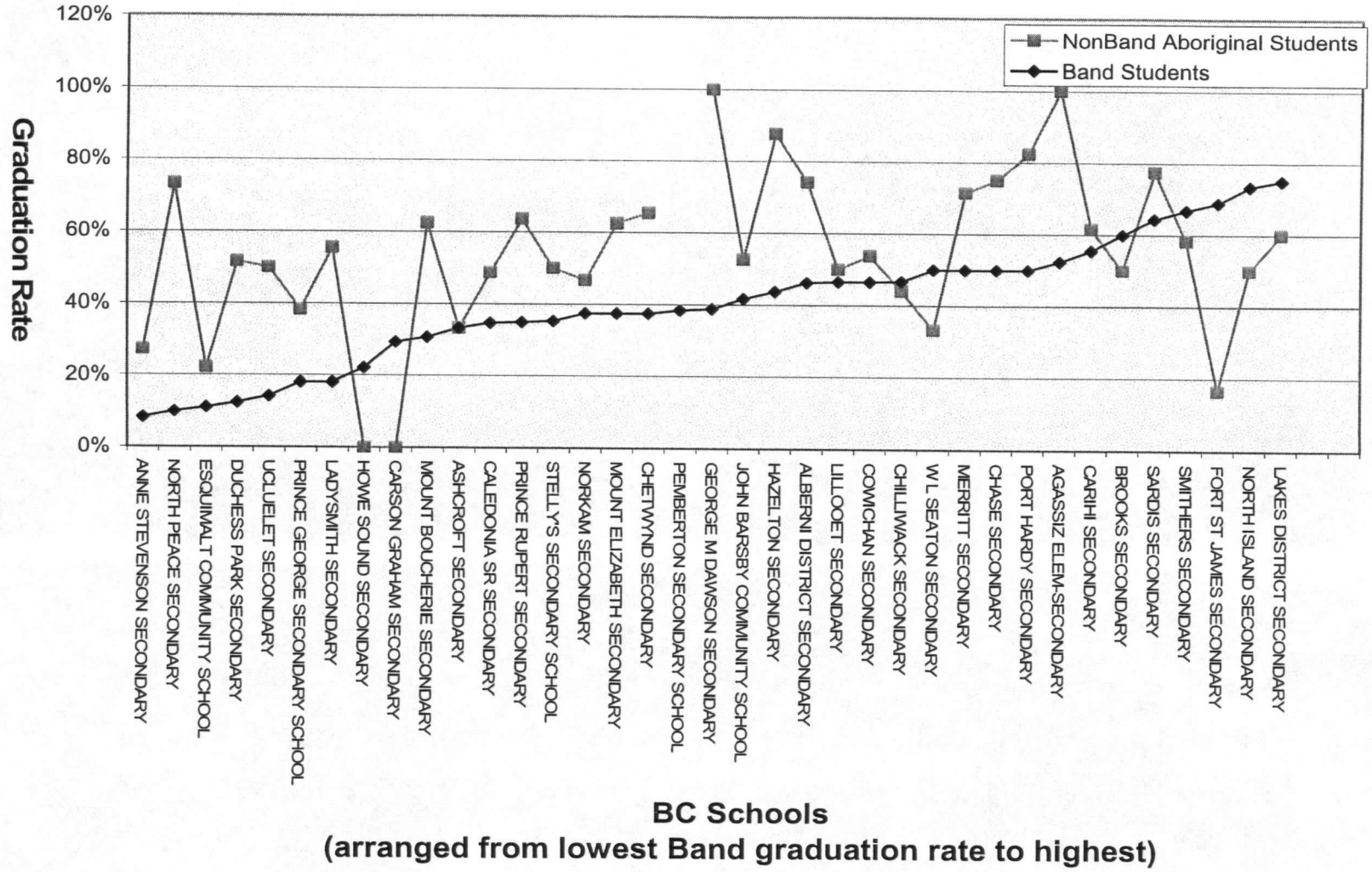

FIGURE 11 Band and Non-Band Aboriginal Graduation Rates in 37 British Columbia Schools in the '98 Cohort

Band students in nearly all cases have lower completion rates than their non-Band peers at the school level. But there are schools where the opposite pattern exists. There are numerous cases where the differences between Band and non-Band graduation rates at the same school differ widely. In order to determine if a relationship exists between completion rates of Band students and non-Band Aboriginal students at a given school, a Pearson r correlation coefficient was calculated. There is a modest relationship between Band graduation and non-Band graduation ($r = 0.274$).

The Figure 12 below depicts schools where the graduation rate of Band students is atypically high or low compared to other British Columbia schools. The schools are identified by name.

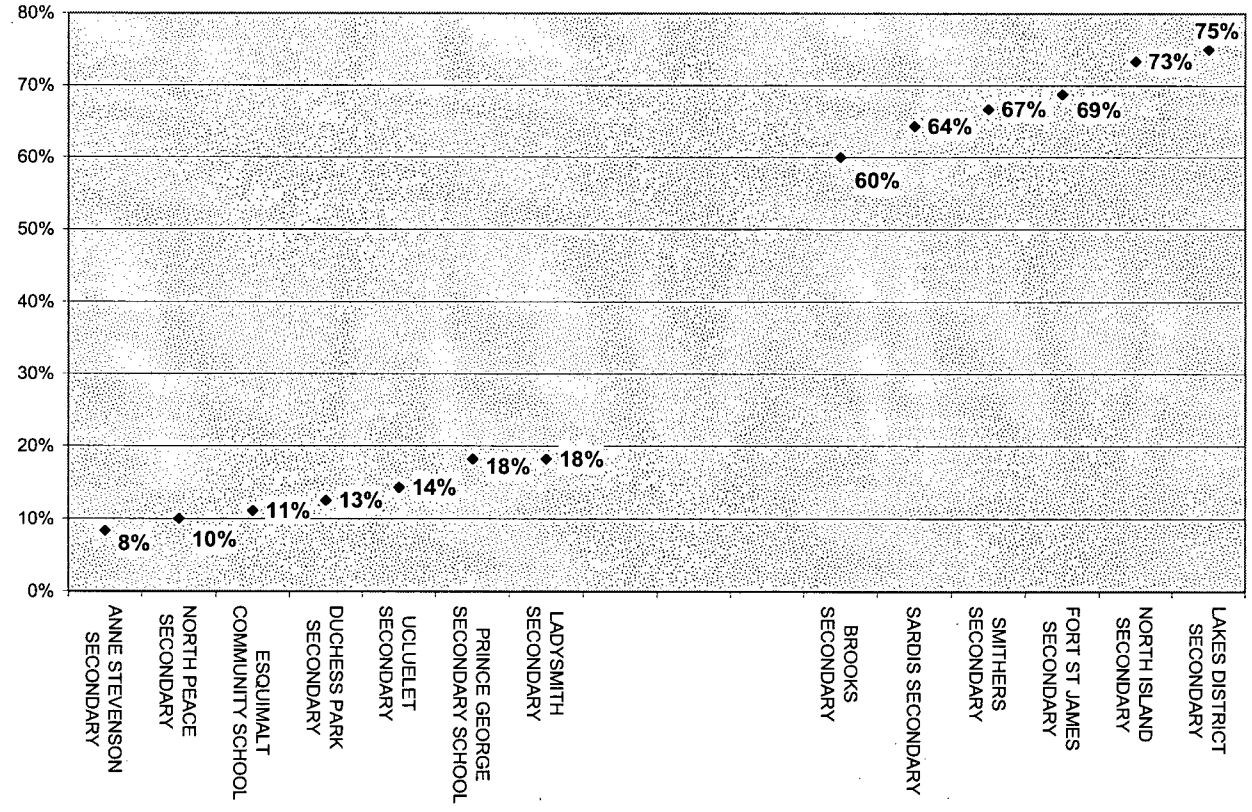

FIGURE 12: Outliers of Band Graduation '98 Cohort

There is wide variability in school completion rates of Band students across British Columbia schools, and examples of schools where Band student completion rates are relatively high. Differences in community context are explored below to determine if socioeconomic factors influence this variability.

Observation 5.11: Variability in Band completion rates occurs across Aboriginal community contexts.

These outlier schools illustrated in Figure 12 are nested in communities across a range of socioeconomic conditions and social deprivation ratings. For example, Ladysmith Secondary – a school where the Band graduation in this cohort year is a standard deviation below the mean Band graduation rates across British Columbia – is located in a population centre where the Aboriginal community conditions are rated a standard deviation *above* the mean. (This is a counterintuitive observation: A low social deprivation rating indicates positive social conditions.) In contrast, North Peace Secondary in Fort St. John is a standard deviation *above* the mean Band graduation rate and is nested in a community where Aboriginal social deprivation is rated to be a standard deviation above the mean across British Columbia.

Two schools where Band graduation rates are atypically high are located in communities where Aboriginal social deprivation is high. These are North Island Secondary (located in Fort MacNeill) and Fort St. James Secondary. Given the level of social deprivation among Aboriginals in these communities, the success of these Band students enrolled at these schools is unexpected.

Implications of Variability of Band Students Completion at the School-Level

Aboriginal students who have received funding as Status, On-Reserve students are not completing school at the same rates as their non-Aboriginal peers *or* their non-Band Aboriginal peers. While there are examples of Bands with atypically high completion rates of Band students, and a handful of British Columbia high schools where high completion rates have occurred, Band students are particularly vulnerable to not completing school within six years. The influence of the proportion of Band students within a high school cohort to student-level and school-level outcomes will be subject to a more refined analysis (see Chapter Six).

PART FIVE

Proportion of Highly Mobile Students in Schools

The mobility of students across high schools over their high school careers emerged as an important feature of the student-level data. A high degree of school change occurs throughout the high school years for a large proportion of Aboriginal students. Students who enter grade eight at one school are in numerous cases enrolled at a different school five years later. That new school may be across town or across the province. A student may have enrolled in several different high schools over time, either within their school district, between school districts, or both.

Observation 5.12: School completion rates of mobile Aboriginal students are lower than those of nonmobile Aboriginal students.

There is a wide range in the proportion of Aboriginal students in school cohorts who have changed schools two or more times across the province's high schools. For example, there are some high schools in the province where at least 50% of the Aboriginal senior class has previously attended two or more different high schools. This was the case in the 2002/2003 school year in high schools in Vernon, Kamloops, Kelowna, Victoria and Prince George. The proportion of mobile Aboriginal students in large urban high schools in Vancouver, Burnaby and Surrey was nearly as high.

Typically mobile Aboriginal students complete school in lower proportions than their nonmobile Aboriginal peers. Figure 13 depicts high schools across the province where senior Aboriginal students had changed high schools two or more times. The completion rate of these mobile students is compared to the completion rate of their nonmobile Aboriginal peers at the same school.

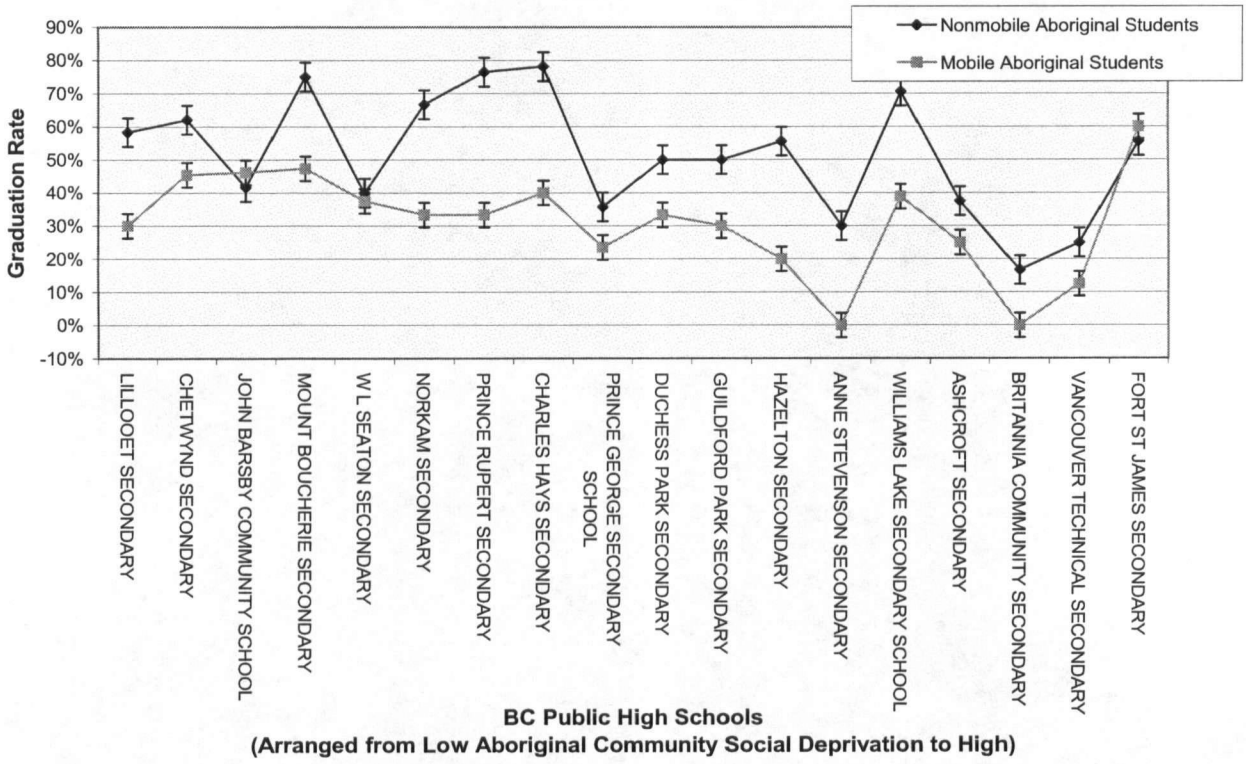

FIGURE 13: Comparing Mobile and Nonmobile Aboriginal Students In British Columbia Schools Where Aboriginal Mobility Occurs.

The schools are arranged by those associated with low Aboriginal community deprivation to those where conditions of high deprivation prevail. Typically the completion rate of the mobile Aboriginal students is lower, though not universally so. There is also an evident trend toward lower completion rates for both mobile and nonmobile student groups in locations where high deprivation in Aboriginal communities prevails. However, this relationship is not completely consistent either. The interaction of economic conditions, mobility and school completion is addressed below.

Observation 5.13: The mobility of Aboriginal students and lower school completion rates is associated with school socioeconomic context.

To get a preliminary sense of the relationships that may exist among mobility rates, completion rates, and broad socioeconomic community conditions, intercorrelation (Pearson r) of these variables was calculated. Mobile and nonmobile Aboriginal peer groups at the school level are compared in Table 17.

Table 17: Relationships of Aboriginal Mobility and Completion at the School Level

	Proportion of Highly Mobile Aboriginal Students	Completion Rate of Aboriginal Mobile Students	Completion Rate of Nonmobile Aboriginal Students
Completion Rate of Mobile Aboriginal Students	-0.180		0.330*
Completion Rate of Nonmobile Aboriginal Students	-0.202	0.330*	

*Correlation is significant at the 0.05 level.

There were modest yet insignificant relationships between the proportion of mobile Aboriginal students and the completion rate of the mobile Aboriginal students (-0.180) and nonmobile Aboriginal students (0.202) at the school level. There was a modest and significant relationship (0.330) between the percentage of mobile Aboriginal students who completed school and the percentage of the nonmobile Aboriginal students in the same school setting that completed. In other words, school completion of both groups at the school level was related to one another.

Relationships between mobility and socioeconomic factors are represented in Table 18 below.

Table 18: Relationships of Aboriginal Mobility, School Completion and Socioeconomic Indicators

	Proportion of Families Less than 20K	Unemploy-ment Rate	Average Income	Proportion Less than High School	Aboriginal Community Social Deprivation Index
Proportion of Highly Mobile Aboriginal Students	-.177	.177	.099	.366**	.212*
Completion Rate of Mobile Aboriginal Students	-.079	-.144	.014	.096	-.178
Completion Rate of Nonmobile Aboriginal Students	-.130	.010	-.072	.095	-.240

*Correlation is significant at the 0.05 level.
**Correlation is significant at the 0.01 level.

There is a moderate relationship between the *percentage* of mobile Aboriginal students at the school level and the proportion of families in the 2-mile school radius with yearly incomes under $20,000 (-0.177). A less evident, but significant relationship appears with school Aboriginal mobility rates and the rate of social deprivation in the Aboriginal community (0.212). There are no significant relationships between community socioeconomic factors and the completion rates of mobile Aboriginal students. There are no significant relationships between community socioeconomic factors and the completion rates of nonmobile Aboriginal students.

Aboriginal student mobility (at least in terms of destination schools) appears to be associated with schools located in negative economic and social conditions for Aboriginal people.

Observation 5.14: Aboriginal mobility rates at the school level vary in locations where school choice exists.

In population centres where choice exists among high schools and there are sizable Aboriginal populations, the rates of mobile Aboriginal students differ at the school level. In other words, it rarely occurs that the high schools within a community each are "destination" schools for highly mobile Aboriginal students. Mobile Aboriginal students frequently "pool" (or are over-represented) at a given high school in a given location. Figure 21 illustrates this phenomenon in locations large enough that choice exists in high schools.

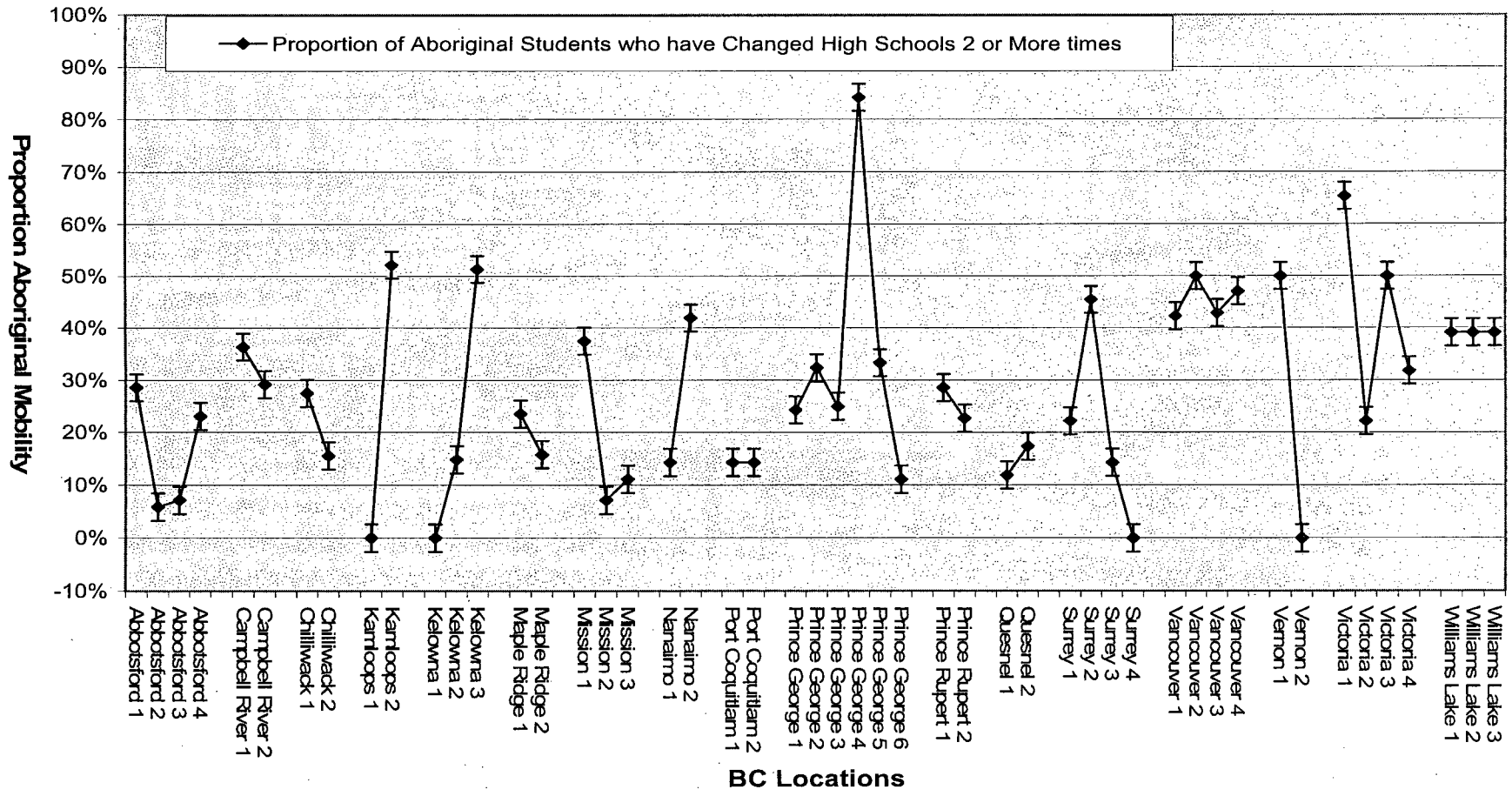

FIGURE 14: Proportion of Mobile Aboriginal Students in Population Centres Where School Choice Exists.

Implications of Variability in Mobile Aboriginal Student Completion at the School-Level

Approximately half of the Aboriginal students do not change high schools or do so only in locations where all students move from junior high or middle schools to senior high schools as the result of grade progression. The completion rate of these nonmobile students is roughly 58%. The other half of the Aboriginal students are mobile within school districts, between school districts and sometimes both. The completion rate of these students is substantially lower. Roughly 29% of these Aboriginal students graduate. However, the distribution of mobile Aboriginal students varies dramatically across the province's schools. It also noteworthy that where choice exists in high schools in population centres, the distribution of Aboriginal students is frequently uneven. Mobile Aboriginal students are associated with schools in negative economic and social community contexts.

There is wide variability in the completion rates of both mobile and nonmobile Aboriginal students. Student mobility is a salient and critical feature of Aboriginal student's school histories. The impact of student mobility on school completion rates of Aboriginal students is pursued in the next chapter.

Conclusion

These school-level observations indicate that the context of public high schools in British Columbia and school outcomes associated with different student populations vary dramatically. Features of the Aboriginal student population – namely Band status and school mobility – clearly emerge as being significant. Comparative analysis of schools is a complex and problematic exercise due to the wide range of school and community contexts and the inconsistent relationships of school outcomes to these contexts. Many schools emerge as sites for further study.

CHAPTER SIX: MODELLING THE INTERACTION OF SOCIOECONOMIC CONTEXT, SCHOOL CONTEXT AND ABORIGINAL COHORT SCHOOL COMPLETION.

A multi-level model was constructed to confirm and quantify the relationship that exists between characteristics associated with the student (mainly Aboriginal status and mobility), and characteristics of community socioeconomic conditions to school completion rates. The basic logic of the model and results follow.

Part One: Background to the Model

The following general hypothesis was tested:

(1) There are significant differences in student populations in terms of school completion within eight years across British Columbia public high schools.

Hierarchical Linear Modelling

In order to model interactions of socioeconomic context, school context and Aboriginal school completion, a hierarchical linear model (HLM) was constructed from the four data sources. The four data sources that are examined in this study provide information regarding British Columbia public schools as a unit of analysis. For each high school, there are numerous years where graduation outcomes and student composition variables can be observed. Hierarchical linear modelling is a statistical procedure used to estimate variance components and interactions between variables when data are "nested" in contextual structures that contribute different degrees of variance. In other words, given that students are "nested" within cohort years, and cohorts are "nested" within schools, calculations of relationships that collapse these structural distinctions may be inaccurate. The hierarchical linear modelling procedure takes different degrees of relationship across the same structural level into account. All data sources were merged according to appropriate linkage identification information in order to create a single data file of students-within-years-within-schools.

Logic of Modelling

The steps of the modelling procedure were:

1. Quantify the difference in likelihood of graduation between non-Aboriginal and Aboriginal students. The average difference represents the expected difference in graduation rate between Aboriginal and non-Aboriginal students across all British Columbia schools. The standard deviations of the difference reflect how the difference varies from year to year or from school to school.

2. Include variables that describe features of the student population associated with non-graduation. These features may also explain some of the difference between Aboriginal and non-Aboriginal graduation rates, as they are not evenly distributed between populations. For example, Aboriginal students may have greater mobility, and since mobility is associated with not graduating, accounting for mobility in the model will account for some of the differences in the graduation rates of Aboriginal and non-Aboriginal student groups.

3. Include variables that describe school-level characteristics associated with non-graduation. These variables may change at the school level from school year to school year and account for change in the overall graduation rates at schools.

4. Include variables that explain changes in overall graduation rates *between* schools. Variables at this stage describe socioeconomic school-level characteristics that I consider to have remained stable throughout the time period referenced in these data.

And, finally

5. The remaining variability in the between-school Aboriginal graduation gap can be used to gauge how well the model addresses the hypothesis: There are significant differences in student populations in terms of school completion within eight years across British Columbia public high schools.

The steps outlined above reflect the students-within-years-within-schools structure of the data. At each stage of modelling, the goal was to produce a *parsimonious* model. *Parsimony* refers to the property of being the simplest explanation possible to account for a situation of a certain level of complexity. Parsimony in building this statistical model is achieved by backward deletion. At each step, the model is built using all predictors. Then, one-by-one, the variables with no effects are removed from the model. The remaining variables with non-zero effects are then each tested for stability by comparing the coefficients of the other variables with and without each variable included in the model. Variables whose coefficients are codependent (i.e., their effects are only non-zero when both are included in the model) are removed from the model. When each step is finalized, the model is fixed at that level and the same process is repeated for the next level of variables.

A technical appendix (Appendix B) provides the SPSS computer coding syntax that was used to prepare the HLM model. The logic of the programming matches the logic used in creating the student-level and school-level observations reported in this work.

Part Two: Null Model Results

The first model presented below (see Table 19) is called a *null model* because no variables are yet included that explain the outcomes of interest. In the null model, the outcome is simply whether or not a student has graduated. The predictor variables are whether a student has ever had Aboriginal status and whether a student has ever had Band status. All students with Band status also have Aboriginal status.

Table 19: Null Model of Non-Aboriginal, Aboriginal and Band-Status Student Likelihood of Graduation

Variable	Effect on probability of graduating	Standard error	Standard deviation (across years)	Standard deviation (across schools)
Non-Aboriginal Status	0.73	(0.01)	0.04	0.15
Aboriginal Status versus Non-Aboriginal Status	-0.24	(0.01)	0.07	0.10
Band Status versus Non-Band Status	-0.15	(0.01)	0.10	0.09

Interpreting the Null Model

Observation 6.1: Variation in graduation rates occurs primarily between schools, not between years.

The overall graduation rate of non-Aboriginal students is 0.73, indicating that just over 7 in 10 non-Aboriginal students are expected to graduate. From year to year, there was a standard deviation of 0.04, suggesting that non-Aboriginal graduation rates were fairly consistent over time. (Data described in Chapter Five support this assertion.)

On average, graduation rates of Aboriginal students tend to be lower (-0.24) than that of non-Aboriginal students. There is smaller variation across years (.07) in the non-Aboriginal student group than the non-Aboriginal student group (0.04). The fact that the Aboriginal variability is smaller than the non-Aboriginal variability over years suggests that although there is some instability in the probability of 0.73 of non-Aboriginal students graduating, regardless, the Aboriginal graduation rate will be 0.24 lower. It should also be noted that the smaller numbers of Aboriginal students in each school relative to non-Aboriginals make the year-to-year estimates more susceptible to random variations associated with small groups in each cohort and cohort

effects. The results for Band status students across years are similar to those described above for Aboriginal students.

Variation in graduation rates occurs primarily between schools, not between years. The variability of the school completion rate in the non-Aboriginal student group is greater across schools (0.15), than across years (0.04). In a similar way, the variability of the school completion rate in the Aboriginal student group is greater across schools (0.10), than across years (0.07). In contrast to the non-Aboriginal and Aboriginal student groups, the variability of non-completion of Band students over time (0.1) and between schools (0.09) is similar. The above caution regarding small numbers producing a cohort effect is repeated here.

The main interpretation from these null model results is the variability of graduation rates across schools is much greater than over time and both Aboriginal and Band students appear to be at risk of non-completion over and above that of their non-Band Aboriginal peers.

Part Three: Explanatory Model Results

The full model presented (see Table 20) describes the final model that was fit to the data in this study. If a variable from the original data does not appear in this model, it is because its effect was insignificant in the context of the other variables in the model. One such insignificant variable (number of Aboriginal students in a school) was left in the model for illustrative purposes.

Table 20: Explanatory Model

Description of effect	Magnitude of effect	s.d. (across years)	s.d. (across schools)
Graduation rate of Non-Aboriginal students in schools with no mobility and no Aboriginal students	0.87	0.04	0.10
The adjustment to this rate per every 10% increment in the percentage of students who were mobile in the school	0.0		
The adjustment to this rate for every 10% increase in the percentage of Aboriginal students in the school	-0.04		
The adjustment for every additional Aboriginal student in the school	0.0		
The adjustment based on if the student has ever been assigned to Secondary Ungraded status	-0.39		
The adjustment based on if the student has changed school districts between grades 8 and 12	-0.16		
The unexplained deficit between Aboriginal and Non-Aboriginal students	-0.17	0.07	0.08
The change in the Aboriginal graduation deficit associated with every 10% increase in the number of families living in low income in the surrounding community	-0.05		
The change in the Aboriginal graduation deficit associated with every 10% increase in the percentage of Aboriginal students in the same school class	0.02		
The unexplained additional risk associated with Band status	-0.16	0.09	0.09
The adjustment in Band status related risk associated with a 10% increase in the proportion of the surrounding community who are Aboriginal	0.02		

Interpreting the Explanatory Model

The explanatory model suggests that expected graduation of non-Aboriginal students with values of "0" for the variables in the explanatory model (those who did not repeat grades or changed schools, who have never had Secondary Ungraded status, who do not attend schools with Aboriginal classmates, and have no low-income families in their communities, etc...) in British Columbia high schools is 87%. If students are Aboriginal, the expected graduation diminishes (-17%) to approximately 70%. If the Aboriginal student has Band status, the expected graduation further diminishes (-16%) to approximately 54%.

Observation 6.2: Factors associated with student populations such as Aboriginal status and mobility are related to graduation rates.

The model conveys information of patterns that are associated with the cohort composition at the school level. Cohorts where there are no Aboriginal students are expected to have an 87% graduation. When cohort compositions have increasing Aboriginal and Band students, associated school graduation rates decline by 3.7% for each incremental change of 10% in the school student population. This pattern should not be interpreted as causal. It is much more likely to be indicative that high proportions of Aboriginal students are correlated with community conditions associated with poorer student outcomes for all students. In other words, Aboriginal students are not uniformly distributed across communities in British Columbia.

The model provides information on the effect of mobility on the expected graduation rate of student groups. While there is no effect of in-district mobility in this model (likely due to non-control of mobility created by school structure change), mobility that involves a change of school districts in high school grade levels diminishes the expected probability of graduation by 16%.

The model indicates that Aboriginal graduation is diminished where there are higher proportions of low-income families in school neighbourhoods. Wherever there is a 10% increase of families living on low incomes in the school neighbourhood, graduation rates diminish by 5%.

The results of the model indicate the hypothetical difference between an Aboriginal student graduating in two otherwise similar classes, one with no other Aboriginal students and one with all Aboriginal students, is 0.21. (Aboriginal graduation deficit associated with every 10% increase in the percentage of Aboriginal students in the same school class is 0.02) Thus it appears, a very interesting relationship emerges when the effects associated with high proportions of

Aboriginal students are present in school cohorts. Higher proportions of Aboriginal students *(notwithstanding* these higher proportions may be more likely to occur in schools in where poor socioeconomic conditions prevail) are linked to increases in Aboriginal graduation *and* Band graduation at the school level. Although Aboriginal students tend to live in less advantaged communities, the graduation deficit appears to be ameliorated somewhat wherever there are increases in the proportion of their classmates who are also Aboriginal. In a similar way, where there is increasing Aboriginal representation in the community, there is a higher probability of graduating for Band status students.

Conclusion

This model confirms the hypothesis that there are significant differences in student populations in terms of school completion within six years across British Columbia public high schools. The proportion of the Aboriginal graduation deficit across schools accounted for in the explanatory model is 38%. The explanatory model confirms factors associated with student populations (Aboriginal status, between-district mobility), and school communities (socioeconomic conditions) explain some of the differences in school graduation rates across British Columbia over the time period that was the focus of this study. Strong inferences can be made regarding the relationships of student mobility, and community context to Aboriginal graduation at the school level. Further, the construction of this dataset and model allows for a more thorough analysis of whether or not these influences effect different individual students and student groups to different degrees.

CHAPTER SEVEN: DISCUSSION AND RECOMMENDATIONS

This chapter provides a discussion of the research process and summarizes the main findings of this work. Policy recommendations regarding targeting educational interventions to vulnerable subpopulations in the Aboriginal student group follow a brief review of research related to Aboriginal residence change, student mobility, and poor achievement. Implications are discussed in terms of education policy at the school, school district and provincial level. As well, issues associated with collecting, interpreting and reporting data pertaining to Aboriginal school outcomes are addressed. Limitations of this study are outlined and future research is suggested.

Exploratory Analysis of Secondary Data and Limitations of this Study

The objective of this study was to explore features within the school-history data of students in public schools across British Columbia over time in order to more fully understand the issue of graduation rates of Aboriginal students. The four data files used were initially a collection of categorical variables. By linking, restructuring, and aggregating these variables, a three-dimensional data set (people in places over time) was created. Following this, an investigation of the outcomes of different years' cohorts of Aboriginal students as they progressed through eight years of high school was conducted. Determining the stories of cohorts province-wide, as well at the school level, was one challenge; pursuing the cohort stories *in comparison* to one another over time was an even more complex challenge.

The original two questions guiding this study were: (1) How have Aboriginal educational outcomes changed over time at the high school level? (2) In which high school contexts do the largest disparities and smallest disparities between Aboriginal and non-Aboriginal school completion occur?

I formulated hypotheses in an attempt to answer these broad questions and then formally tested them. In some cases, the nature of the available data did not support a given line of analysis. In other cases, careful observation of the data revealed the inadequacy of my prior conceptualization of key issues. For example, I did not expect to find many anomalies in the progression of students through the grades. I was aware than many students repeated grades, and many Aboriginal students were given secondary ungraded status. However I was not expecting to

see that as many as 50% of Aboriginal students were enrolled in grades in which they were previously enrolled, or that some Aboriginal students spent as many as four years in a single grade before progressing to the next grade, or that many Aboriginal students had their schooling interrupted frequently throughout high school.

Although I understood that cohort loss (student dropout) was part of the cohort's story, I did not immediately perceive that student membership of school cohorts was unstable as opposed to fixed. By tracking the schools associated with individual students, it became clear that many students had unstable school trajectories. The movement of the cohort over time through a school was also accompanied by a geographic dispersion and redistribution of students. As it turned out, schools are not stable structures either. The insight that the school structures were subject to change over time added an additional layer of complexity that I had not anticipated. I imagined this study would delineate locations where change in graduation rates of Aboriginal students tended to occur. However, I feel this study *emphasizes* that underlying movement in the student population influences those changes.

Whether Aboriginal educational outcomes have changed over time at the high school level is a question that is not answered definitively in this study due the complexity of measuring change across widely differing school structures and community contexts. The challenge is further complicated by the fact that the number of Aboriginal students in a given school is typically a small number. Further, student characteristics of Aboriginal students that have a profound impact on educational outcomes are not distributed proportionately across school cohorts, schools, or time. There are several data issues that likely had an impact on the analysis and interpretation of Aboriginal student outcomes in this study. It is likely reporting changes of Aboriginal students, funding policies, and data integrity have contributed an additional unknown degree of uncertainty.

Where are the disparities between Aboriginal and non-Aboriginal students greatest and smallest? This was the second broad question guiding this work and more readily answered in this work. All the challenges and complexities regarding making *fair* comparisons between student groups at the school level should apply in evaluating, measuring and quantifying disparities. This work demonstrates that disparities are generally greater in school contexts where unfavourable socioeconomic conditions prevail, and where the student composition includes Band students and highly mobile Aboriginal students. Yet these associations are not universal.

It may be that what is left unaddressed in this work may be further illuminated by theoretical work regarding how variables associated with cultural identification (Aboriginal and Band Status) are captured in such administrative data of which this exploration lies upon. How targeted funding and mobility are operationalized in administrative data should be considered through sociological frames which problematize categorical variables. Implications once discovered will provide insight to the nature of the phenomena that such data seeks to represent. There are also issues of validity in using socioeconomic indicators that represent geographic regions at specific points in time as measures associated with student populations. Those measures may not represent mobile populations are groups within populations accurately. Consideration of the limitations of these data should assist those designing studies that use either more refined primary data related to the issue of school attainment and Aboriginal students or others conducting work with similar secondary data.

This work uses student-level administrative data to lay the foundation for understanding the dynamics of community context and demographics and identifying schools that produce equitable outcomes beyond what might be predicted. This work demonstrates that such schools do indeed exist. For those educators and policy makers interested in addressing the equity issue of school outcomes of Aboriginal students, both an understanding of the socio-geographic pattern of inequities *and* the awareness of the presence of atypical schools presented here should be of value.

Implications for British Columbia Schools

Student demographics such as On-Reserve or Band status and mobility emerged from the data in this exploratory study as a critical dimension in understanding student-level and school-level educational outcomes in British Columbia's public schools. One Canadian study links post secondary school attainment of status Aboriginals to (among numerous other factors) number of high schools attended (Brade, Duncan, & Sokal, 2003). There is evidence that On-Reserve status is negatively related to student academic outcomes in Canada (see Armstrong, 1999, Mueller, 2005; Statistics Canada 2001a; 2001b; 2005). In the Statistics Canada analyses, poor school outcomes are comorbid with many negative social and economic conditions associated with Aboriginal populations living On Reserve. There is statistical evidence that mobility, or residence change, or migration as it is referred to in demographic research, is a prevalent feature of Aboriginal populations in many places in the world – including Canada. Another recently released Canadian

report on Aboriginal demography (Siggner & Costa, 2005) states that 49% of Aboriginal people in Vancouver, British Columbia have moved between communities at least once in the last five years.

The limited research that examines Aboriginal mobility focuses on patterns by gender and age, motivations for residence change, and prevalence of migration and return migration. As Cooke (2002) makes evident, a pull to urban areas from Canadian reserves has often been noted, while the return push from urban areas back to reserves has seldom been studied. Clatworthy (1995), Cooke (2002) and Taylor (1998) observe that migration to and from urban areas often follows a seasonal pattern or is tied to family and cultural commitments. The migration patterns may also be linked to the search for employment or improved living conditions. Some have suggested that mobility is also tied to the successful pursuit of higher education or specialized training and is associated with an emerging Aboriginal urban middle class (Graham & Peters, 2002; Wotherspoon, 2001). These researchers argue that providing education (and other public services) for Aboriginal populations that migrate across jurisdictions is a logistical challenge. Thus, mobility of Aboriginal people has important service delivery implications, the most basic of which is that providing any level of *sustained* service is difficult.

While student transience is recognized as a salient feature in numerous large urban centres in both the United States and in Great Britain, research on student populations that are mobile is difficult to conduct. Because mobility occurs over time and across settings, it is very difficult to acquire meaningful data. For this reason, research is often restricted to case studies in a single localized area. These studies are typically researcher observation of instruction and/or educators' insights regarding the implementation of school interventions (for example, Behar-Horenstein, 2002; Demie, 2002; Fisher, Matthews, & Stafford, 2002; Hanna, 2003; Nakagawa, Stafford, & Fisher, 2002; Sanderson, 2003). The interventions most frequently discussed are outreach to students and families, and providing a welcoming school climate. Learning interventions may be to offer language support, implement individualized academic support, and break curriculum into small discrete segments. Interventions where educational support is designed to occur across school jurisdictions are outlined in Branz-Spall (2003) who describes information-sharing protocols, electronic information transfer systems, distance learning programs and the provision of notebook computers for migrant students. This research offers an indication of how teachers and schools attempt to serve mobile students. However, empirical evidence of the *efficacy* of such interventions is difficult to locate.

Some research has empirically linked poor school outcomes to student mobility (Alspaugh, 1998; Fetler, 1999; Kerbow, 2003; Nelson, Simoni, & Adelman, 1996; Rumberger, 2003, Rumberger & Larson, 1998; Sanderson, 2004). Yet most research also qualifies this relationship as one of co-morbidity of academic achievement, socioeconomic status and, potentially, race. This larger body of research is frequently focused on untangling the interaction of mobility on test scores. (Standardized test scores are possibly the only consistent source of information about student achievement in most educational jurisdictions.) However, test scores are an inadequate measure of student ability and a questionable measure of school performance. McGee (1997) conducted a statistical analysis that argues one state assessment actually "tests for" the student characteristics of poverty and mobility. In contrast, studies where additional controls have been sought on prior academic achievement provide some evidence that mobility in the early grades and frequent mobility throughout school years are detrimental (Heinlein & Shinn, 2000; Ingersoll, Scamman & Eckerling 1989; Mantzicopoulos & Knutson, 2000; Nelson, Simoni and Adelman, 1996, Temple & Reynolds, 1999; Wright, 1999).

The confounding issue of prior student achievement highlights interesting school structure issues in student mobility research. Mobility conceptually can be considered as "school relocation" for some students (such as children of corporate and military families). Sometimes school change has occurred as a positive selection resulting from informed parental choice of schools. School mobility is also correlated with school attrition at the student level. Once students have dropped out of school, they often likewise drop off the radar of researchers (even those focused on mobility) and are left unaccounted for. A few researchers (Kerbow, 2003; Nelson, Simoni, & Adelman, 1996; Parsons, Chalkley & Jones, 2000) have provided evidence that the "magnets" for mobile students are urban schools in economically poor neighborhoods. This sort of research redirects attention to the larger sociological dynamics of mobility as a problem affecting population centres and their schools. As Krivo et. al. (1998) and Massey and Eggers (1990) demonstrate concentrated disadvantage – poverty and other disadvantage – often is confined to specific neighbourhoods in urban centres (as opposed to being proportionately evident in all neighbourhoods). Access and availability of jobs and affordable housing appear to interact with race and within the US city geographies studied. In impoverished neighbourhoods, high school dropout rates are observed to be very high. Willms (2003) examines this community effect in international and local assessment measures of student skill performance to understand the dynamics of how the performance of students from less advantaged backgrounds varies across

community locations, while the performance of high performing students varies to far lesser degrees.

Overall, the mobility research supports the fact that mobile students are at risk for poor school outcomes. The research bolsters arguments that schools with highly mobile populations must be provided with additional support in their efforts to ameliorate negative social and academic consequences associated with mobility. This body of research informs the implications and policy recommendations that arise from my study.

POLICY RECOMMENDATIONS FOR PUBLIC SCHOOLS

(1) Schools should continue to attend to how well Aboriginal students are doing in comparison to non-Aboriginal students. Increasing graduation rates in the Aboriginal student population are part of an overall trend of increasing graduation rates of all students as demonstrated in this study. However inequities still exist. Broad comparisons between student groups provide a general measure of disparities in school outcomes. As I have shown, a less superficial analysis that follows individual students will provide more accurate and valuable information.

(2) Comparisons of school rates of Aboriginal graduation or any other school-related measure by year or across schools are misleading. Fundamentally different populations of students may exist each year or in each school. Data must be analyzed in a manner that makes student demographic features evident before comparisons are made, particularly regarding school progress or program success. This is the main observation of this research. Analysis that disaggregates data beyond surface student characteristics (such as the "Aboriginal" designation) is far more likely to provide useful information. It is critically important to locate and celebrate exemplars of success as they provide further direction toward improvement.

(3) Schools should attend to how well distinct subpopulations of Aboriginal students are doing. Band students (On-Reserve Status Indian students) emerged in this research as a student subgroup that typically does not have strong school outcomes. This work demonstrates that this

subpopulation of students is particularly vulnerable. Interventions and resource targeting might provide improved outcomes.

(4) System-wide interventions in education should be adopted for students who are highly mobile. This study demonstrates that this subgroup of students is vulnerable to poor academic outcomes. Enhanced communication with and between educators across school settings should occur. Interventions could involve prior learning assessment for students, and the design of the most suitable educational programs for such students. Flexibility in restructuring of curriculum and course delivery for these students might be considered. For example, instruction could be broken down into small, discrete, and sequential units that facilitate mastery for, and promote confidence in, mobile students. Individualized learning portfolios could be developed for and accompany Aboriginal students who move schools. Technology and strategies employed in distance learning may provide mobile students with additional instructional support. Mobile students should not be left to fall through the cracks, become another school's problem, or lose the momentum and confidence built up in each learning setting.

(5) The capacity to develop, implement, and refine interventions for mobile students must be provided through additional and targeted Ministry of Education funding. Schools where high rates of mobility exist must be financially supported, though such support is likely to be expensive. Mobile students are not a visible or vocal group; mobile Aboriginal students may be particularly below the radar in a reality of competing demands for scarce educational dollars. Yet, as demonstrated in this study, these students are among the most vulnerable to school attrition and non-completion. Additional financial support and human resources must be provided to schools facing high degrees of student mobility in order to successfully address inequity.

(7) The high degree of erratic grade progression, grade retention, grade recategorization and school interruption of Aboriginal students should be subject to more rigorous examination in the Ministry of Education's accountability regime and district audits. Others who have observed these patterns have speculated that some of these atypical school career paths may be the consequence of the provincial education funding system. School districts are currently, and traditionally have been, provided additional "targeted" funds (i.e. funds that must be spent on providing educational service for every Aboriginal student enrolled) over and above the base amount a student in the district receives. Student categorization, student enrolment patterns and atypical school careers in Aboriginal students may be prevalent due to the scarcity of education

dollars and the desirability of securing additional funds. Atypical school careers may also be related to overall increasing trends in school retention. If schools are retaining vulnerable students, adequate programs should be developed to better address their needs.

(8) Data related to school context and community context are valuable and should be systematically gathered and shared. Much of the variability in school results is likely associated with factors beyond student characteristics. The personnel, programs, policies and practices at the school level may contribute significantly to the variability in Aboriginal school success. Other important school context variables might be funding and resource allocation, school structure, leadership style, disciplinary climate, and homework policies. The qualification, experience and attitudes of teachers may play a role. Further, instructional variables such as program design, lesson activities, curriculum, and classroom structure and climate might influence Aboriginal academic success.

Directions for Further Research

This study provides a broad overview and does not adequately address all questions regarding differences between Aboriginal students who complete school and those who do not. It does not answer all questions regarding factors at the school setting that are associated with graduation. It does not provide a definitive model on how socioeconomic conditions interact with school settings and student populations. Evidence regarding critical issues of school choice and student migration and the impact of these on both students who change schools and those who remain in these schools is not fully rendered. However, this study does provide valuable foundational knowledge to inform more *focused* research and more targeted interventions at the school level.

This overview was created from secondary data. There are limitations inherent to the structure of the available data. For example, missing cases of mobile students and students who did not persist in the school system likely exist for six of the eight cohort years. It is unknown how reporting protocol and increasing pride in self-identification as Aboriginal affect which subpopulation of the entire student population is considered Aboriginal. The lack of school-level variables, other than those that were aggregated from the student-level files, substantially limits the view of the school context. Issues associated with structural change over time of school districts

and schools also arise. Without local knowledge of the nature of school programs, closures, openings, grade structure changes, catchments and busing issues it is impossible to interpret data associated with schools. Socioeconomic and demographic variables associated with neighbourhoods and communities, especially those least stable over time, may play a critical role in school outcomes. These are not readily available or comprehensive. Such variables are difficult to tie to the student level. Much is to be gained in seeking for more extensive and/or refined secondary data analysis or, alternately, primary data. Given the strong interest and commitment of educators, administrators and Aboriginal communities to evidence-based data-driven research, it would seem likely that these partner groups would willingly cooperate in data collection.

Suggested directions for further research are:

(1) There is a need to investigate the effect of *prior* mobility, in addition to mobility that occurs at high school, on Aboriginal school completion. This study did not examine how many school changes may have occurred prior to high school for individual students. Tracking the total number of school changes, the nature of origin schools and destination schools, and perhaps the grade levels where mobility occurred over a school career would likely add important information in understanding differences in the school outcomes of mobile students. These entire school-career data were available for only one cohort. However, as the British Columbia Ministry of Education continues with its data-collection regime, in future years more cohorts can be examined.

(2) The patterns of success associated with Band students should be examined. Bands were not the unit of analysis in this study. It was observed that many Bands currently have relatively high graduation rates; there may be Bands where the graduation rates of students are rapidly improving. The policies, practices, and community contexts of these Bands certainly deserve further investigation. The data in this study indicated that many Band students were both mobile and/or inconsistently identified with a Band. There are also specific schools where high rates of school completion of Band cohorts is occuring. A related issue that should be investigated is the impact that mobility and inconsistent identification with Bands by students may have on school attainment.

(3) The relationship of mobility to academic attainment should be thoughtfully examined. It would be helpful to better understand how to minimize disruptions in educational programs and

in what capacity schools can provide academic continuity. It may be that some timetabling strategies, subject areas, curriculum implementation, or instructional formats are more conducive to the academic success of students who change schools. It may be that programs could be developed in order to promote student resilience across school and districts by building academic skills as well as delivering content.

(4) The social impact of school transience on students should be examined. There may be interactions between peer groups, academic attainment, and mobility. There is a substantial body of educational research that suggests that socio-emotional factors are critical to students' learning. How does *school change* affect a student's peer relationships? In what conditions do positive and negative peer influences occur among mobile students? This research provided an indication that, in schools where there are large proportions of Aboriginal students, the school completion rates of Aboriginal students increased. Are there positive and negative interactions between mobile and nonmobile students in school settings? Does the dynamic of this differ for Aboriginal students? If there are negative effects on students in schools where there are high levels of transience, understanding the social impact of mobility at the student level will provide helpful insights in order to develop school capacity in welcoming and successfully incorporating new students into the student body.

(5) An analysis should occur of the differences between the origin schools and destination schools of mobile students. Where do mobile students end up? This study has provided evidence that Aboriginal student mobility occurs disproportionately in some communities and in some schools. It was observed that mobile Aboriginal students tend to relocate in schools where socioeconomic conditions are poor. The effect of this pooling on the mobile Aboriginal students, their nonmobile peers and the schools involved should be understood. Alternately, research on the impact of school choice suggests that where "cream skimming" occurs, or where students likely to be successful move from their local school, the remaining student cohort is disadvantaged by the loss. If there are negative effects on students in schools where there are high levels of transience, understanding the impact of mobility at the school level will provide helpful insights in order to develop school capacity in supporting all students of the school.

(6) The impact of cultural programs on student outcomes is poorly understood and needs to be examined. Currently, much of the policy focus of the provincial government and Aboriginal advocacy groups is on building a more culturally-inclusive and respectful infrastructure in the

public school system and providing culturally-inclusive curriculum. This study observed some differences in which Aboriginal student groups were enrolled in culturally-specific programming and significant variation in the number of years students were enrolled. There is a lack of information regarding what this programming involves, whether there are differences across school districts and schools, and whether Aboriginal students are fully benefiting from these programs. Data associated with additional programming support, school practices, and implementation of locally-developed enhancement agreement strategies may provide evidence that these policy initiatives are or are not successful.

(7) The patterns associated with school outcomes in schools with small numbers (seven or fewer) of Aboriginal students needs to be investigated. This research does not adequately capture the interaction of school outcomes, school context and community context in school settings where there are few Aboriginal students. To conduct such an analysis, a more sensitive research strategy and appropriate methodology are required. Group comparisons (over time, over schools or between student populations) when there are small numbers are misleading and significance of differences not readily determined. Correlates of success for such Aboriginal students are likely to remain obscure. Case study methods might be helpful to understand factors that enhance or impede the educational trajectories of Aboriginal students in such school settings.

(8) There should be a rigorous effort to determine whether change over time in completion rate of Aboriginal students in schools is occurring. Measures of the performance of unique cohorts aggregated to the school level or the school district level are not adequate. If change can be quantified, the geographic, demographic, socioeconomic, and community contexts associated with change must be illuminated. Further, the features of school contexts such as policy, program, personnel, and practices and localized Aboriginal enhancement agreement practices that are associated with consistent and positive change must be identified. If change is associated with student reporting changes and data integrity, this too needs to be clarified.

(9) The impact of differences between and within Aboriginal community contexts on Aboriginal student outcomes should be investigated. This research indicates that there is considerable variability across British Columbia schools and communities in Aboriginal school outcomes. Community conditions associated with Aboriginal people are likely to be distinct across First Nations and across the province. These distinctions may provide important information regarding school attainment of Aboriginal students. Features of Aboriginal communities that are

associated with equitable school outcomes between Band and non-Band students should be identified. Features of Aboriginal communities that are associated with equitable outcomes with non-Aboriginal students should also be determined. It may be that the localized socioeconomic conditions, history, leadership, infrastructure, policy initiatives, and funding structures of Aboriginal communities interacts with educational climate and practices and student outcomes.

Conclusion

This study examined differences between Aboriginal and non-Aboriginal school outcomes in the province of British Columbia. This study is unique in that a nearly universal data set of student school histories was available for analysis. To the best of my knowledge such a comprehensive data set has never been available in a North American school jurisdiction. These data allowed for longitudinal, geographic and demographic features within the data to emerge while drawing on student-level, school-level and community-level information. The observations reported here, as well as the model constructed here of expected graduation of student groups, provide clear and unequivocal evidence that significant disparities exist among students.

This study confirms that Aboriginal students are not achieving equitable outcomes in British Columbia's public schools. Furthermore, this study identifies that two factors, (1) mobility and, (2) Band status are associated with increasing risk and vulnerability to poor school outcomes over and beyond that associated with Aboriginal students. The detection of the extent of mobility (nearly 50% of students have changed high schools) in the Aboriginal student group is an important finding and should feature predominantly in the formation of educational policy and interventions for Aboriginal students. The confirmation that Band students are a risk for poor school outcomes should similarly be a call for action to support these students.

This work has implications for educators and others in interpreting school performance data that are typically presented as school, school district, or provincial aggregations. Such aggregations do nothing to reveal which factors are associated with successful outcomes at either the student, the school, or the community level. This work exposes the lack of utility of such aggregations to make comparisons of different cohorts of students or evaluate change over time. I have highlighted the complexity of making valid comparisons across student groups, across school contexts, across community contexts and over time. I have also indicated that when such valid and

sensitive comparisons can be made, valuable information regarding resilient students and successful school settings can be inferred.

Given the research findings I have presented here, I feel that those who work to improve equity for vulnerable student groups should demand a more detailed, nuanced, and sensitive accountability agenda from the British Columbia public education system. I also strongly feel that those who work to improve equity for Aboriginal students in particular should expect that research, policy, school interventions and funding be generated to more fully meet the needs of Band students and mobile students over and beyond the current Aboriginal education initiatives.

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APPENDIX A: 103 PUBLIC HIGH SCHOOLS OF AVERAGE COHORTS OF OVER SEVEN ABORIGINAL STUDENTS OVER EIGHT YEARS

School District	City	Name of High School
6	Invermere	DAVID THOMPSON SECONDARY
8	Creston	PRINCE CHARLES SECONDARY
19	Revelstoke	REVELSTOKE SECONDARY
19	Trail	J LLOYD CROWE SECONDARY
22	Vernon	CLARENCE FULTON SECONDARY
22	Vernon	W L SEATON SECONDARY
23	Winfield	GEORGE ELLIOT SECONDARY
23	Kelowna	MOUNT BOUCHERIE SECONDARY
23	Kelowna	RUTLAND SECONDARY
27	Williams Lake	ANNE STEVENSON SECONDARY
27	Williams Lake	COLUMNEETZA SECONDARY
27	100 Mile House	PETER SKENE OGDEN SECONDARY
28	Quesnel	QUESNEL SECONDARY SCHOOL
28	Quesnel	CORRELIEU SECONDARY SCHOOL
33	Chilliwack	SARDIS SECONDARY
33	Chilliwack	CHILLIWACK SECONDARY
34	Abbotsford	ROBERT BATEMAN SECONDARY
34	Abbotsford	YALE SECONDARY
34	Abbotsford	RICK HANSEN SECONDARY
34	Abbotsford	ABBOTSFORD SENIOR SECONDARY
35	Fort Langley	WALNUT GROVE SECONDARY
35	Langley	LANGLEY SECONDARY
35	Aldergrove	ALDERGROVE SECONDARY
36	Surrey	EARL MARRIOTT SECONDARY
36	Surrey	FRANK HURT SECONDARY
36	Surrey	GUILDFORD PARK SECONDARY
36	Surrey	QUEEN ELIZABETH SECONDARY
39	Vancouver	TEMPLETON SECONDARY
39	Vancouver	VANCOUVER TECHNICAL SECONDARY
39	Vancouver	BRITANNIA COMMUNITY SECONDARY
40	New Westminster	NEW WESTMINSTER SECONDARY
41	Burnaby	BURNABY SOUTH SECONDARY
42	Maple Ridge	GARIBALDI SECONDARY
42	Pitt Meadows	PITT MEADOWS SECONDARY
42	Maple Ridge	MAPLE RIDGE SECONDARY

43	Port Moody	PORT MOODY SR SECONDARY
43	Port Coquitlam	RIVERSIDE SECONDARY
43	Port Coquitlam	TERRY FOX SECONDARY
43	Coquitlam	CENTENNIAL SR SECONDARY
44	North Vancouver	CARSON GRAHAM SECONDARY
46	Sechelt	CHATELECH SECONDARY
47	Powell River	BROOKS SECONDARY
48	Pemberton	PEMBERTON SECONDARY SCHOOL
48	Squamish	HOWE SOUND SECONDARY
50	Queen Charlotte City	QUEEN CHARLOTTE SECONDARY
50	Masset	GEORGE M DAWSON SECONDARY
51	Grand Forks	GRAND FORKS SECONDARY SCHOOL
52	Prince Rupert	CHARLES HAYS SECONDARY
52	Prince Rupert	PRINCE RUPERT SECONDARY
54	Houston	HOUSTON SECONDARY
54	Smithers	SMITHERS SECONDARY
57	Prince George	COLLEGE HEIGHTS SECONDARY
57	Prince George	D P TODD SECONDARY
57	Prince George	KELLY ROAD SECONDARY
57	Prince George	PRINCE GEORGE SECONDARY SCHOOL
57	Prince George	DUCHESS PARK SECONDARY
58	Merritt	MERRITT SECONDARY
59	Chetwynd	CHETWYND SECONDARY
59	Dawson Creek	SOUTH PEACE SECONDARY
60	Fort St John	NORTH PEACE SECONDARY
61	Victoria	SPECTRUM COMMUNITY
61	Victoria	ESQUIMALT COMMUNITY SCHOOL
61	Victoria	VICTORIA HIGH SCHOOL
62	Victoria	BELMONT SECONDARY
62	Sooke	EDWARD MILNE COMMUNITY SCHOOL
63	Saanichton	STELLY'S SECONDARY SCHOOL
67	Penticton	PENTICTON SECONDARY
68	Ladysmith	LADYSMITH SECONDARY
68	Nanaimo	NANAIMO DISTRICT SECONDARY
68	Nanaimo	JOHN BARSBY COMMUNITY SCHOOL
69	Qualicum Beach	KWALIKUM SECONDARY
69	Parksville	BALLENAS SECONDARY
70	Ucluelet	UCLUELET SECONDARY
70	Port Alberni	ALBERNI DISTRICT SECONDARY
71	Comox	HIGHLAND SECONDARY
71	Courtenay	GEORGES P VANIER SECONDARY
72	Campbell River	TIMBERLINE SECONDARY SCHOOL
72	Campbell River	CARIHI SECONDARY
73	Clearwater	CLEARWATER SECONDARY SCHOOL
73	Kamloops	KAMLOOPS SECONDARY

73	Kamloops	NORKAM SECONDARY
73	Chase	CHASE SECONDARY
74	Ashcroft	ASHCROFT SECONDARY
74	Lytton	KUMSHEEN ELEM-SECONDARY
74	Lillooet	LILLOOET SECONDARY
75	Mission	HATZIC SECONDARY SCHOOL
75	Mission	HERITAGE PARK SECONDARY
75	Mission	MISSION SECONDARY
78	Hope	HOPE SECONDARY
78	Agassiz	AGASSIZ ELEM-SECONDARY
79	Duncan	COWICHAN SECONDARY
81	Fort Nelson	FORT NELSON SECONDARY
82	Kitimat	MOUNT ELIZABETH SECONDARY
82	Terrace	CALEDONIA SR SECONDARY
82	Hazelton	HAZELTON SECONDARY
83	Salmon Arm	SALMON ARM SENIOR SECONDARY
85	Fort MacNeill	NORTH ISLAND SECONDARY
85	Port Hardy	PORT HARDY SECONDARY
91	Vanderhoof	NECHAKO VALLEY SECONDARY
91	Fort St James	FORT ST JAMES SECONDARY
91	Fraser Lake	FRASER LAKE ELEM-SECONDARY
91	Burns Lake	LAKES DISTRICT SECONDARY

APPENDIX B: SPSS SYNTAX

```
*************************************************************************************************
```

This syntax file performs data manipulations to produce a multi-level data file with derived variables from data provided by the British Columbia Ministry of Education. This syntax file requires a file structure "C:\Aman\" containing the data sets:

```
'C:\Aman\refreshedgraddate_19Oct2005\cheryl_retain_91-
92_refreshedgraddate_19Oct2005_nopen.sav';

'C:\Aman\refreshedgraddate_19Oct2005\cheryl_retain_02-
03_refreshedgraddate_19Oct2005_nopen.sav';

'C:\Aman\data_9Dec2004_SPSS\Retain_SLDC_02-03_9Dec2004_nopen.sav';

'C:\Aman\data_9Dec2004_SPSS\Retain_SLDC_91-92_9Dec2004_nopen.sav'.


MERGE original data sets.
GET FILE='C:\Aman\refreshedgraddate_19Oct2005\cheryl_retain_91-
92_refreshedgraddate_19Oct2005_nopen.sav'.
ADD FILES /FILE=*
 /FILE='C:\Aman\refreshedgraddate_19Oct2005\cheryl_retain_02-
03_refreshedgraddate_19Oct2005_nopen.sav'.
EXECUTE.

REMOVE duplicated cases.

SORT CASES BY casenum.
IF (casenum=LAG(casenum)) duplic=1.
EXECUTE.

SELECT IF MISSING(duplic).
EXECUTE.

MATCH FILES /FILE=*
 /TABLE='C:\Aman\data_9Dec2004_SPSS\Retain_SLDC_02-
03_9Dec2004_nopen.sav'
 /TABLE='C:\Aman\data_9Dec2004_SPSS\Retain_SLDC_91-
92_9Dec2004_nopen.sav'
 /BY casenum.
EXECUTE.
```

```
*************************************************************************************
                                DERIVED VARIABLES
*************************************************************************************

ASSIGN students to cohort, depending on the first year they had entered secondary.
(Note: secondary is defined as first year grade eight.)

COMPUTE xcohort=0.
FORMATS xcohort (F4.0).
DO REPEAT a=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 y1999 y2000
y2001 y2002 y2003 /b=1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001
2002 2003.
IF ((a="08") AND xcohort=0) xcohort=b.
END REPEAT.

CREATE filter to identify and subselect cohort=1998 students.
IF (xcohort=1998) filt9=1.

COMPUTE maximum grade reached by each student, as well as count number of
interuptions, grade repetitions, and assignments to SU status.
COMPUTE mxgrade=0.
COMPUTE nmintrpt=0.
COMPUTE nmrepgr=0.
COMPUTE SUstat=0.
EXECUTE.
FORMATS mxgrade nmrepgr SUstat (F2.0).
FORMATS nmintrpt (F2.0).
STRING last (A4).

DO REPEAT a=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 y1999 y2000
y2001 y2002 y2003 /b=1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001
2002 2003.
DO IF (xcohort<=b AND xcohort>b-6).
IF (mxgrade<NUMBER(a,f2)) mxgrade=NUMBER(a,f2).
IF (a=last AND a~="") nmrepgr=nmrepgr+1.
IF (a="" AND last~="") nmintrpt=nmintrpt+1.
IF (a="SU") SUstat=SUstat+1.
COMPUTE last=a.
END IF.

END REPEAT.
EXECUTE.


COMPUTE SUstatd=0.
IF (SUstat>0) SUstatd=1.
IF (last="") nmintrpt=nmintrpt-1.

COMPUTE tempx = NUMBER(SUBSTR(grad,5,2),f6).
```

```
IF (tempx<=6) gradyr = NUMBER(SUBSTR(grad,1,4),f6).
IF (tempx>6) gradyr = NUMBER(SUBSTR(grad,1,4),f6)+1.

COMPUTE gradyr = NUMBER(SUBSTR(grad,1,4),f6).
FORMATS gradyr (F4.0).
COMPUTE intrrpflg=0.
IF (nmintrpt>0) intrrpflg=1.
EXECUTE.

ASSIGN graduation status based on expected grad date and completion of school
years.
IF (gradyr<=xcohort+6) gradflag=1.
IF (gradyr>xcohort+6) gradflag=2.

COMPUTE number of secondary districts attended.
STRING temp (A12).
COMPUTE nmhdist=0.
COMPUTE temp="".
EXECUTE.
DO REPEAT a=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 y1999 y2000
y2001
  y2002 y2003 /b=dis1991 dis1992 dis1993 dis1994 dis1995 dis1996 dis1997 dis1998
dis1999 dis2000 dis2001 dis2002 dis2003
  /c=1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003.
DO IF (xcohort<=c AND xcohort>c-5).
IF (nmhdist=0 AND (a="08" OR a="09" OR a="10" OR a="11" OR a="12" OR a="SU"))
temp=b.
IF (nmhdist=0 AND (a="08" OR a="09" OR a="10" OR a="11" OR a="12" OR a="SU"))
nmhdist=1.
IF (b~=temp AND nmhdist>0 AND b~="") nmhdist=nmhdist+1.
IF (b~=temp AND nmhdist>0 AND b~="") temp=b.
END IF.
END REPEAT.
IF (temp="" AND nmhdist>0) nmhdist=nmhdist-1.
EXECUTE.

DELETE VARIABLES temp.

COMPUTE number of secondary schools attended.

STRING temp (A12).
COMPUTE nmhschls=0.
COMPUTE temp="".
EXECUTE.
DO REPEAT a=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 y1999 y2000
y2001
  y2002 y2003 /b=schl1991 schl1992 schl1993 schl1994 schl1995 schl1996 schl1997
schl1998 schl1999 schl2000 schl2001 schl2002 schl2003
 /c=1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003.
```

```
DO IF (xcohort<=c AND xcohort>c-5).
IF (nmhschls=0 AND (a="08" OR a="09" OR a="10" OR a="11" OR a="12" OR
a="SU")) temp=b.
IF (nmhschls=0 AND (a="08" OR a="09" OR a="10" OR a="11" OR a="12" OR
a="SU")) nmhschls=1.
IF (b~=temp AND nmhschls>0 AND b~="") nmhschls=nmhschls+1.
IF (b~=temp AND nmhschls>0 AND b~="") temp=b.
END IF.
END REPEAT.
IF (temp="" AND nmhschls>0) nmhschls=nmhschls-1.
EXECUTE.

DELETE VARIABLES temp.

COMPUTE outmobil=0.
COMPUTE inmobil=0.
IF (nmhschls>1 AND nmhdist>1) outmobil=1.
IF (nmhschls>1 AND nmhdist=1) inmobil=1.

COMPUTE attrition.
COMPUTE attrit=0.
IF (last="" AND gradflag=2) attrit=1.
EXECUTE.

FORMATS attrit (F1.0).

COUNT the number of years identifying as Aboriginal and calculate proportion of total
years.
COMPUTE yrsAB=0.
COMPUTE yrsABtot=0.
DO REPEAT a=ab1991 ab1992 ab1993 ab1994 ab1995 ab1996 ab1997 ab1998
ab1999 ab2000 ab2001 ab2002 ab2003
 /b=schl1991 schl1992 schl1993 schl1994 schl1995 schl1996 schl1997 schl1998
schl1999 schl2000 schl2001 schl2002 schl2003 .
IF (b~="") yrsABtot=yrsABtot+1.
IF (a="Y") yrsAB=yrsAB+1.
END REPEAT.
IF (yrsABtot>0) prpyrsAB=yrsAB/yrsABtot.


COUNT the number of years identifying with Band status and calculate proportion of
total years and create Band status flag.

COMPUTE yrsBand=0.
DO REPEAT a=Band1995 Band1996 Band1997 Band1998 Band1999 Band2000
Band2001 Band2002.
IF (NOT(Missing(a))) yrsBand=yrsBand+1.
END REPEAT.
COMPUTE Bandstat=0.
```

```
IF (yrsBand>1) Bandstat=1.


COUNT the number of years with Aboriginal program funding and calculate proportion
of total years.
COMPUTE yrsProgm=0.
COMPUTE yrsProgmtot=0.
DO REPEAT a=cult1995 cult1996 cult1997 cult1998 cult1999 cult2000 cult2001
cult2002 /b=othe1995 othe1996 othe1997 othe1998 othe1999 othe2000 othe2001
othe2002
/c=supp1995 supp1996 supp1997 supp1998 supp1999 supp2000 supp2001
supp2002 .
IF (a~="" OR b~="" OR c~="") yrsProgmtot=yrsProgmtot+1.
IF (a="Y" OR b="Y" OR c="Y") yrsProgm=yrsProgm+1.
END REPEAT.
IF (yrsProgmtot>0) prpyrsProgm=yrsProgm/yrsProgmtot.
EXECUTE.

COUNT the number of years in Public schools and calculate proportion of total years.
COMPUTE yrsPub=0.
COMPUTE yrsPubtot=0.
DO REPEAT a=pub1991 pub1992 pub1993 pub1994 pub1995 pub1996 pub1997
pub1998 pub1999 pub2000 pub2001 pub2002 pub2003 .
IF (a~="") yrsPubtot=yrsPubtot+1.
IF (a="P") yrsPub=yrsPub+1.
END REPEAT.
IF (yrsPubtot>0) prpyrsPub=yrsPub/yrsPubtot.
EXECUTE.

DETERMINE THE number of times each student's school changed because of school
structure.
DO REPEAT a=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 y1999 y2000
y2001 y2002 y2003
  /b=min1991 min1992 min1993 min1994 min1995 min1996 min1997 min1998
min1999 min2000 min2001 min2002 min2003 .
RECODE a (CONVERT) INTO b.
END REPEAT.
EXECUTE.

DEFINE schchng (invars=!CHAREND('/'))

!DO !i !IN (!invars)
!LET !schid=!CONCAT(schl,!i).
!LET !min=!CONCAT(min,!i).
SORT CASES BY !schid.
AGGREGATE OUTFILE=!min /BREAK =!schid /!min=MIN(!min).
DELETE VARIABLES !min.
MATCH FILES FILE=* /TABLE=!min /BY !schid.
EXECUTE.
```

```
!DOEND.

!ENDDEFINE.

schchng invars=1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002
2003.

STRING temp (A12).
COMPUTE schlchng=0.
COMPUTE temp="".
EXECUTE.
DO REPEAT a=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 y1999 y2000
y2001
  y2002 y2003 /b=schl1991 schl1992 schl1993 schl1994 schl1995 schl1996 schl1997
schl1998 schl1999 schl2000 schl2001 schl2002 schl2003
  /c=1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003
  /d=min1991 min1992 min1993 min1994 min1995 min1996 min1997 min1998
min1999 min2000 min2001 min2002 min2003.
IF (a="08" OR a="09" OR a="10" OR a="11" OR a="12") tempx=1.
DO IF (xcohort<=c AND xcohort>c-5 AND tempx=1).
IF (b~=lastschl AND a~=lastgrade AND a=d) schlchng=1.
IF (b~=temp AND schlchng>0 AND b~="") temp=b.
END IF.
COMPUTE lastgrade=NUMBER(a,F2).
COMPUTE lastschl=b.
END REPEAT.
EXECUTE.

*****************************************************************************************

                    Produce multi-level data files:
                    students-within-years-within-schools
*****************************************************************************************
```

ASSIGN students to single schools (school of last secondary attendance) also, cut list of schools down to only secondary school attendance.
Three school id variables are produced – The first identifies school membership for analysis – the second identifies school membership of secondary entry.
The third identifies school membership for the purpose of estimating school context.

```
STRING schoolid (A12).
STRING schoolid2 (A12).
STRING schoolid3 (A12).
DO REPEAT a=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 y1999 y2000
y2001 y2002 y2003
  /b=schl1991 schl1992 schl1993 schl1994 schl1995 schl1996 schl1997 schl1998
schl1999 schl2000 schl2001 schl2002 schl2003
  /c=sch1991 sch1992 sch1993 sch1994 sch1995 sch1996 sch1997 sch1998 sch1999
sch2000 sch2001 sch2002 sch2003
```

```
 /d=1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003.
DO IF (xcohort<=d AND xcohort>d-5).
STRING c (A12).
IF (a="08" OR a="09" OR a="10" OR a="11" OR a="12" OR a="SU") c=b.
IF (b~="") schoolid=b.
IF (a="08" AND schoolid2="") schoolid2=b.
END IF.
IF (b~="") schoolid3=b.
END REPEAT.
EXECUTE.
```

ASSIGN students to single years (year of last secondary attendance-5 to match with cohort grad years).
This assignment is used to estimate aggregate characteristics of school context for students at specific grad years.
School context is defined as the aggregation of the senior students in each school for each relevant year.

```
STRING yearid (A4).
COMPUTE temp=1986.
DO REPEAT a=sch1991 sch1992 sch1993 sch1994 sch1995 sch1996 sch1997
sch1998 sch1999 sch2000 sch2001 sch2002 sch2003.
IF (a~="") yearid=STRING(temp,F4.0).
COMPUTE temp=temp+1.
END REPEAT.
EXECUTE.
```

ASSIGN numeric aboriginal flag and compute aboriginal-only base values for aggregation.

```
COMPUTE aborflag=0.
IF (everabor="Y") aborflag=1.
IF (aborflag=1) abgrad=gradflag.
IF (aborflag=1) abmobil=nmhschls.
IF (aborflag=1) abintrpt=nmintrpt.
IF (aborflag=0) nabgrad=gradflag.
IF (aborflag=0) nabmobil=nmhschls.
IF (aborflag=0) nabintrpt=nmintrpt.
IF (aborflag=1) Bandflag=Bandstat.
EXECUTE.
```

CREATE level 2 data set – years within schools.

```
AGGREGATE
  /OUTFILE='C:\Aman\year_level.sav'
  /BREAK=schoolid3 yearid /allgrad=MEAN(gradflag) /abgrad=MEAN(abgrad)
/nabgrad=MEAN(nabgrad)   /propBand=MEAN(Bandflag) /allmobil=MEAN(nmhschls)
  /abmobil=MEAN(abmobil) /nabmobil=MEAN(nabmobil)
```

```
  /allinterr=MEAN(nmintrpt) /abinterr=MEAN(abintrpt)  /nabinterr=MEAN(nabintrpt)
/propabor=MEAN(aborflag)  /numabor=SUM(aborflag) /schsize=N.
EXECUTE.

FILTER OFF.

SAVE OUTFILE='C:\Aman\temp_process.sav'.

CREATE level 1 data set – students within years within schools (note that, for
students, year is the cohort year).
IF (aborflag=0) Bandflag=0.
EXECUTE.

VARIABLE LABELS xcohort 'student cohort' mxgrade 'highest grade reached within
six years' nmintrpt 'number of interruptions within six years'
nmrepgr 'number of grade repetitions in six years' SUstat 'number of years with SU
status within six years' last 'last grade ever reached'
intrrpflg 'has student ever had interruption' SUstatd 'has student ever had SU status'
gradyr 'year of graduation' filt9 'is student in 1998 cohort'
gradflag 'did student graduate or not' nmhdist 'number of districts attended in six years
period' nmhschls 'number of high schools attended during six year period'
yrsAB 'number of years Aboriginal status' prpyrsAB 'proportion of years with aboriginal
status' yrsBand 'number of years Band status' Bandstat 'ever had Band
status'yrsProgm 'number of years in a funded program' prpyrsProgm 'proportion of
years in a funded program' yrsPub 'number of years in public school,prpyrsPub
'proportion of years in public school' aborflag 'ever had aboriginal status' abgrad
'student is aboriginal and graduated'
abmobil 'student is aboriginal and number of schools' abintrpt 'student is aboriginal
and number of interruptions' nabgrad 'student is not aboriginal and graduated'
nabmobil 'student is not aboriginal and number of schools' nabintrpt 'student is not
aboriginal and number of interruptions' Bandflag 'student has ever had Band status'
schoolid 'schoolid of potential graduation' schoolid2 'schoolid of secondary entry'
schoolid3 'schoolid of last school ever attended' yearid 'year of potential graduation'
attrit 'student has left BC system before graduating'.

DELETE VARIABLES yearid.

STRING yearid (A4).
COMPUTE yearid=STRING(xcohort,F4.0).
EXECUTE.

SORT CASES BY schoolid yearid.
EXECUTE.

SELECT cases that entered secondary in the 91-98 time period (actually, create flag
to perform selection after

DEFINE seldata (vars=!CMDEND)
```

```
COMPUTE xselect=0.
!DO !i !IN (!vars)
IF (!i="08") xselect=1.
!DOEND.
EXECUTE.

!ENDDEFINE.

seldata vars=y1991 y1992 y1993 y1994 y1995 y1996 y1997 y1998 .

SAVE OUTFILE='C:\Aman\temp_process.sav'.

SELECT IF xselect=1.
EXECUTE.

SAVE OUTFILE='C:\Aman\student_level.sav' /KEEP=schoolid schoolid2 schoolid3
yearid xcohort filt9 mxgrade nmintrpt nmrepgr SUstat SUstatd gradyr
intrrpflg gradflag nmhdist nmhschls outmobil inmobil attrit yrsAB prpyrsAB yrsBand
Bandstat yrsProgm prpyrsProgm yrsPub prpyrsPub aborflag
abgrad abmobil abintrpt nabgrad nabmobil nabintrpt Bandflag .



**********************************************************************************************
                                    Create school level data file
**********************************************************************************************

GET FILE='C:\Aman\school_census_7April2005\school_census_7April2005.sav'.

STRING schoolid (A12).
COMPUTE
schoolid=LPAD(LTRIM(RTRIM(STRING(MINCODE_CURRENT,F11.0))),8,'0').
EXECUTE.
SORT CASES BY schoolid.
EXECUTE.

SORT CASES BY schoolid.

AUTORECODE
  VARIABLES=SCHOOL_FACILITY_TYPE  /INTO schltype
  /BLANK=MISSING
  /PRINT.

IF (schoolid=LAG(schoolid)) duplic=1.
EXECUTE.

SELECT IF MISSING(duplic).
EXECUTE.
```

```
SAVE OUTFILE='C:\Aman\school_census_7April2005\temp.sav'.


GET DATA /TYPE=XLS
 /FILE=
 'C:\Aman\school_census_7April2005\2001_census_8Sept2004_7April20'+
 '05.xls'
   /SHEET=name 'OneMile 2001 School Lev'
   /CELLRANGE= range 'A2:F2249'
   /READNAMES=off
   /ASSUMEDSTRWIDTH=32767.


RECODE
  V2 V3 V4 V5 V6 (CONVERT)
  (MISSING=SYSMIS)  (ELSE=SYSMIS)  INTO  nohsch abor avinc15 lowinc unemp  .
EXECUTE .


RENAME VARIABLES (v1=mincode).

VARIABLE LABELS mincode "Mincode" nohsch "Education Attainment - Proportion
Less than High School"abor "Proportion Aboriginal Ethnic Origin"
avinc15 "Pop 15+ Average income" lowinc "Proportion Families Less Than 20K
Income" unemp "15+ Unemployment rate".

STRING schoolid (A12).
COMPUTE schoolid=mincode.
SORT CASES BY schoolid.
EXECUTE.

IF (schoolid=LAG(schoolid)) duplic=1.
EXECUTE.

SELECT IF MISSING(duplic).
EXECUTE.


MATCH FILES /FILE=*
 /FILE='C:\Aman\school_census_7April2005\temp.sav'
 /BY schoolid.
EXECUTE.



SAVE OUTFILE='C:\Aman\school_level.sav' /KEEP=schoolid nohsch abor avinc15
lowinc unemp schltype.
EXECUTE.
```

```
GET FILE='C:\Aman\school_level.sav'.

MVA
  nohsch abor avinc15 lowinc unemp
  /EM ( TOLERANCE=0.001 CONVERGENCE=0.0001 ITERATIONS=25 LAMBDA=1
  PROPORTION=0.5
  OUTFILE='C:\Aman\school_census_7April2005\imputedschool.sav' )
  .

DELETE VARIABLES nohsch abor avinc15 lowinc unemp.

MATCH FILES /FILE=*
 /FILE='C:\Aman\school_census_7April2005\imputedschool.sav'.
EXECUTE.
SAVE OUTFILE='C:\Aman\school_level.sav' .
GET FILE='C:\Aman\school_level.sav'.
ERASE FILE='C:\Aman\school_census_7April2005\temp.sav'.
ERASE FILE='C:\Aman\school_census_7April2005\imputedschool.sav'.

GET
  FILE='C:\Aman\student_level.sav'.
MATCH FILES /FILE=*
 /TABLE='C:\Aman\year_level.sav'
 /BY schoolid yearid.
EXECUTE.
MATCH FILES /FILE=*
 /TABLE='C:\Aman\school_level.sav'
 /BY schoolid.
EXECUTE.

DESCRIPTIVES
  VARIABLES=aborflag Bandflag gradflag attrflag higrade interrupts graderep
  SUstat SUstatd gradtype districts mobil inmobil yrsAB prpyrsAB yrsBand
  yrsProgm prpyrsProgm yrsPub prpyrsPub allgrad abgrad propBand allmobil
  abmobil allinterr abinterr propabor numabor schltype nohsch abor avinc15
  lowinc unemp
  /STATISTICS=MEAN STDDEV MIN MAX .


***some manual intervention is necessary at this stage to fix a bug introduced by
SPSS (odd out-of-range values are applied during the linkage).

IF (allgrad>1) allgradx=1.
IF (abgrad>1) abgradx=1.
IF (numabor>355) numaborx=1.
EXECUTE.

***It appears the bug is only introduced to the top row of data.
```

```
DELETE VARIABLES allgradx abgradx numaborx.

SAVE OUTFILE='C:\Aman\multi_level.sav'.

MEANS
  TABLES=gradflag attrflag higrade interrupts graderep SUstatd mobil  BY
  yearid BY aborflag
  /CELLS MEAN  .

MEANS
  TABLES=gradflag attrflag higrade interrupts graderep SUstatd mobil  BY
  yearid BY Bandflag
  /CELLS MEAN  .
```