

BC AVID Pilot Project: long-term postsecondary outcomes

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Table of contents

Introduction	1
Overview of the intervention	1
Context of this report	5
Overview of BC AVID's research samples and outcomes of interest	8
Research samples	8
Sub-group definitions	9
Outcomes of interest	10
Post-secondary impacts of BC AVID	13
Impacts of offering BC AVID	15
Exposure analysis	32
Summary of findings	37
References	38
Appendix A: Graphical presentations of annual impacts	39

Introduction

The BC Advancement Via Individual Determination (BC AVID) Pilot Project was an ambitious venture that funded 15 school districts to implement the Advancement via Individual Determination (AVID) program from scratch in 21 schools in British Columbia, Canada. The professional development, implementation and outcomes were tracked in immense detail through a 10-year research effort that collected and linked quantitative and qualitative data on the experiences of the first two cohorts of Grade 8 students selected for BC AVID (see for example Dunn et al., 2008). 27 of the 31 cohorts of Grade 8 students tracked for 10 years were randomly assigned to program, control and waiting list groups in a careful design that would facilitate the measurement of program impact. The AVID Center and local AVID-trained educators from non-participant AVID schools provided broad support to the project effort and the training of the educators involved. The Canadian Millennium Scholarship Foundation (CMSF) provided generous funding for the program's development and implementation in BC.¹

Social Research and Demonstration Corporation (SRDC), the project's evaluators, have released three major reports. They found that on average offering eligible BC students a place in the AVID class improved their high school engagement, rigorous course taking and standardized test results, but had no immediate impact on their graduation or postsecondary enrollment rates soon after high school. These are robust estimates comparing their outcomes against a randomly-assigned — and thus statistically-identical — control group.

At the time of the enrolment, the research team obtained participants' consent to determine later impacts on postsecondary persistence, completion and labour market outcomes. The AVID Center has supported SRDC to pursue further data acquisition and analysis. This report presents long-term postsecondary impacts estimated for ten years after the initial randomization, using recently-acquired administrative records covering enrolment in post-secondary institutions in BC.

Overview of the intervention

AVID is an educational program developed by a San Diego high school English teacher, Mary Catherine Swanson, during the 1980s. Broadly speaking, she designed it to improve postsecondary access for "students academically in the middle" (Dunn et al., 2008, p. 2). The BC AVID

The funding provided by the Canada Millennium Scholarship Foundation took two forms. First, all districts and schools received an annual grant administered by the British Columbia Ministry of Education that covered the costs of going to the AVID Summer Institutes for 2 years with a full site team and a 3rd year with a partial site team (fees, travel and accommodation), all training required for the District Director (fees, travel and accommodation), the acquisition of the AVID library, the annual AVID site fee (in most cases, for 5-6 years) and the hiring of tutors (in most cases for 5 years). Second, participating schools and districts were reimbursed for attending other mandatory training events held in the province and they were compensated for the time required for selecting AVID eligible students for each recruitment year. In total, amounts per school averaged \$250,000 over 6 years. Thus for the project as a whole, the implementation cost alone exceeded \$4.5m, roughly \$4,500 per student in the two initial cohorts. Costs associated with participating in and conducting the research were additional to this.

Pilot Project is a test of a version of AVID that was implemented in high schools in British Columbia from 2005 onwards. The basic idea behind AVID is to change the high school experience of students believed to have as-yet-untapped potential to succeed in postsecondary education by increasing the rigour of their coursework and providing, in the context of an elective class, several different kinds of support for their learning. The selected students are expected to commit to full enrolment in the AVID elective class (in the case of BC AVID that spans four years in high school) and also to enrol in the most rigorous courses in their school. The US non-profit AVID Center was founded by Ms. Swanson to develop the AVID curriculum, train educators to deliver the program, and certify sites on their delivery of AVID. The AVID elective class is the primary vehicle for the delivery of these supports, often called AVID strategies or techniques. The elective class is supposed to meet daily during the regular school day and offers a program of instruction in academic "survival skills."

It is important to point out that the BC AVID Pilot Project is testing a particular version of AVID. Offering four years in the elective class to AVID-eligible Grade 9 students is not the only type of program that can carry the AVID label. Some AVID programs start earlier and some later than Grade 9. Increasingly, educators have been encouraged to implement AVID school-wide, which means some elements of the elective class are made available to all students in the school. This project evaluates BC AVID as an offer of four years in the AVID elective class made only to students who are eligible to be in the class.

The AVID course is structured into three main components: the curriculum class, tutorials, and motivational activities. The curriculum class teaches the students how to study, read for content, take notes, work collaboratively, and manage time. Tutorials are led ideally by tutors who are currently postsecondary students. Tutors are trained to use skilful questioning to raise students' understanding of their course work. AVID students' elective class time is devoted 40 per cent to curriculum class activities, 40 per cent to tutorials, and 20 per cent to motivational activities. This last category includes guest speakers, team-building activities, and field trips to postsecondary campuses, all intended to promote the idea that postsecondary study is attainable.

The main features of AVID are summarized in 11 AVID "Essentials" developed by the AVID Center and provided to all BC AVID Pilot Project sites. The Essentials function as a general blueprint that all AVID programs should follow. Each is briefly described below:

- Resources: The school or district must identify resources to meet program costs, agree to
 implement AVID Program Implementation Essentials, and work toward participation in annual
 AVID certification.1 Commitment to ongoing participation in AVID staff development is also
 required. The staff trained should include an AVID district director, school administrator, one or
 more teachers of the AVID elective class, a school-based coordinator of the AVID program, other
 subject area teachers, and one or more counsellors. Among these staff responsible for
 implementation of the program, those based at each AVID school constitute the AVID school site
 team.
- **School site team**: The AVID school site team should be active and collaborate on issues of student access to, and success in, rigorous university preparation courses.

- **Selection**: AVID student selection must focus on students in the middle (with a GPA of 2.0 to 3.5 as one indicator), who have untapped academic potential and would benefit from AVID support to improve their achievement and postsecondary preparation.
- **Full implementation**: The school must be committed to full implementation of the AVID Program, with the AVID elective class available within the regular academic school day.
- **Rigour**: AVID students must enrol in a rigorous course of study that will enable them to meet requirements for postsecondary enrolment.
- **Data**: AVID schools/districts must provide program implementation and student progress data. These data will be monitored through the AVID Data System, with results analyzed to inform the AVID certification process.
- **Participation**: AVID program participants, both students and staff, must choose to participate.
- **Writing**: A strong, relevant writing curriculum must provide the basis for instruction in the AVID elective class.
- **Inquiry**: Inquiry must be used as a basis for instruction in the AVID classroom.
- **Collaboration**: Collaboration must be used as a basis for instruction in the AVID classroom.
- **Tutorials**: A sufficient number of trained tutors must be available in the AVID class to facilitate student access to a rigorous curriculum.

The importance of providing each of the Essentials is incorporated into the professional development run by the AVID Center and its implementation guides and manuals. As well, for the BC AVID Pilot Project it was built into agreements between the BC Ministry of Education and 15 school districts, and documented in the Pilot Project's Operations Manual, which was issued to sites that took part in the pilot project. In principle, the Essentials form a coherent whole that should not be adopted piecemeal. They include numerous non-teaching tasks: recruiting and selecting students; organizing motivational activities inside and outside school; recruiting, training, and coordinating the activities of AVID tutors; and ensuring that AVID students have support as they enrol in rigorous high school courses, tackle the course work in those classes, and navigate the postsecondary application and financial aid systems. In U.S. implementations, the emphasis is typically placed on university application and enrolment. The BC AVID Pilot Project set out to determine the effect of offering AVID on access to any type of postsecondary education, but also considers university outcomes separately, in case of displacement between different types of programs.

Differences between BC AVID and US AVID

Of note in interpreting the results is how BC AVID differs from the US AVID program. While the goal of BC AVID is essentially the same as AVID and was modelled as such, BC AVID differs in several important ways from AVID. These differences are both intentional and emergent. The main intentional differences included the following:

- While AVID focuses on four-year college (in Canadian terms, university) enrollment, the
 outcome of interest in BC AVID is increased enrolment in any form of postsecondary education,
 including community or technical college, university, or apprenticeship programs. Nevertheless,
 BC AVID encourages students to take courses that provide them with the academic eligibility
 requirements for attendance at a university should they decide to pursue that option.
- The BC high school curriculum includes a compulsory class (Planning 10) that overlaps to a significant extent with the AVID elective class curriculum. As such the two courses were combined to some extent. While mixing the curricula allowed BC AVID students to meet the requirements of the Planning 10 course this may have resulted in deviation from the required AVID curriculum and the extent and effects of its occurrence are unclear.
- Enrolment in rigorous courses is one of the essentials of the AVID program. In the US, where AVID was developed, the system of Advanced Placement (AP) courses, which are universitylevel courses taught at high school, is well established and allows for an easy definition of a "rigorous" course. In contrast, Canada's system of AP courses is less developed and therefore defining "rigorous" courses using the BC curriculum is more challenging. As such, the definition of a "rigorous" course was largely left up to educators to determine as they thought would best fit the objectives of BC AVID.
- Finally, standardized testing plays an important role in AVID since it affects the selection of
 incoming students by U.S. universities. While there are several high school provincial
 examinations in the BC curriculum, BC universities do not place similar emphasis on
 standardized test results as part of their entry requirements. The absence of such high stakes
 testing makes it difficult to assess how far BC AVID meets AVID's delivery objectives associated
 with such tests.

Several differences that were not anticipated were revealed during the implementation of BC AVID. These included the following:

- First, there was an unanticipated high level of turnover in students and staff experienced in BC AVID. More than half of all Grade 8 students who were assigned to receive four years of AVID elective classes had stopped attending BC AVID by Grade 12. Moreover, more than two-thirds of the project's AVID elective classes experienced turnover of the teacher between grades 9 and 12. While neither student nor teacher turnover is unique to BC AVID, since it occurs in U.S. AVID as well, such high turnover may have consequences regarding the effectiveness of AVID, if its effectiveness depends on extended exposure to the program.
- Second, BC AVID schools experienced difficulty both in recruiting sufficient numbers of tutors for the AVID elective classes and in scheduling a sufficient number of tutoring hours. As a result, BC AVID tutors were more commonly older high school, not postsecondary education students. Moreover, the proportion of AVID elective class time devoted to tutorials for BC AVID students was 24 per cent, far below the desired 40 per cent target set by AVID Center.
- Third, the students who participate in AVID programs in the US are different in several ways from the students who are participating in BC AVID, even though both groups are identified as "students academically in the middle". The recruitment process for BC AVID was carefully

orchestrated by the project partners with the goal of recruiting a group of students who met criteria equivalent to those set out by the AVID Center. Nonetheless, those criteria do not guarantee that the resulting characteristics of the recruited participants will be the same, in part, due to differences in school populations and existing programs. For example, one of the recruitment recommendations from the AVID Center is that AVID programs seek out students who are eligible for subsidized school lunch programs, a criterion that is often used to identify low-income students in U.S. schools. However, British Columbia lacks such a convenient way of identifying low-income students. The implication of having "students in the middle" who were not as economically disadvantaged as U.S. AVID students and who were not as likely to belong to ethnic minorities as U.S. AVID students are not clear.

Lastly, BC AVID had to deviate, in a number of ways, from AVID because the structure of high school education in British Columbia is different from the structure assumed by AVID's designers. The most important of these differences involved the scheduling of the elective class. As designed, the AVID elective class is supposed to meet for 50 minutes every day of the school year, implying about 150 hours of AVID instruction per student per year. Because of the nature of scheduling practices in BC, BC AVID elective classes were scheduled for 65-85 minutes, but only on every other day of the school year. The overall time available per student per year in the AVID elective class amounted to about 116 hours.

However, despite the differences highlighted here between AVID and BC AVID, it must be noted that overall BC schools met the majority of the criteria for delivery of the AVID program. While no cohort consistently received an offer of BC AVID for the duration of the program, delivery to each cohort of project participants met at least 61 per cent of project-set criteria over the four years and often up to 84 per cent of them (Ford et al., 2014).

The project recruited 1,522 Grade 8 students identified as eligible for the AVID class in two cohorts based on September 2005 and September 2006 entry. At 14 of the 18 sites, SRDC randomly assigned the eligible students into program, waitlist, and control groups. Those assigned to the program group were offered a place in the AVID elective class; those assigned to the control group were not offered a place in the AVID class and therefore had to choose a different elective course. Waitlist students could take a seat in the class if a vacancy arose. The random assignment ensured that the average characteristics of the program and control groups were identical. Any subsequently emerging differences between the groups can be attributed to the offer of the program, eliminating competing explanations for differences in outcomes (like "creaming" the more promising students in student selection).

Context of this report

The BC AVID Pilot Project researchers developed criteria based on the AVID Essentials to assess whether schools met requirements for delivery of the BC AVID program for each school year. The criteria were defined as those program elements sufficiently necessary that if any were absent for a class in a given grade year, the program experience for that year would be judged "not BC AVID". The researchers applied these (their own) criteria to assess the fidelity of AVID program at the BC AVID Pilot Project sites and concluded AVID had not been given a "fair test" overall. While all schools implemented AVID Certification Self Study and were certified as delivering AVID in 16 of 18 sites in the last year of implementation of BC AVID, schools varied in the strength of adherence to the researchers' criteria. Schools also varied in terms of the educational attainment of the AVID-assigned students relative to control group students.

It is potentially of concern that a carefully constructed implementation, adequately supported with financial and human resources and meeting AVID Centre's criteria to be considered "AVID", did not yield key differences in postsecondary outcomes sought by the school boards, students and other stakeholders. While BC AVID did not yield positive or negative impacts on access to postsecondary education after the first year of high school, this does not mean that impacts would not be observed over longer periods. Students who were offered BC AVID were more likely to have taken rigorous course work during their high school years and were more likely to have received training on note taking and critical thinking (Dunn et al., 2010). Thus BC AVID may yet have positively influenced students' abilities to **persist** through postsecondary education and graduate with a postsecondary credential, more than their counterparts in the control group. Program group members' experiences included engaging more often in rigorous coursework, note taking and critical thinking. This may have better prepared them for the challenges experienced in postsecondary studies. Alternatively, program group members' experiences with BC AVID may have prepared them better in understanding themselves such that they made better postsecondary educational decisions that fit with their aptitude and career interests.

There are some high profile examples of high school programs' success emerging only after longterm observations of their impacts. MDRC's evaluation of the Career Academies initiative did not yield significant impacts on *any* measured educational outcome and yet the program is considered to have one of the strongest evidence bases for ongoing implementation, due to impacts on earnings observed long after the participants had graduated postsecondary education (Kemple, 2008). Given BC AVID has demonstrated several impacts on educational outcomes already, longerterm positive impacts are still highly plausible. The positive impacts observed for disadvantaged youth who engaged in interventions evaluated by SRDC as part of the Future to Discover project (see for example: Ford & Kwakye, 2016) similarly have larger magnitude after nine years than they did after three.

In the U.S., about 40 per cent of post-secondary students who enrol in college seeking a bachelors' degree do not graduate within 6 years. Some students are struggling to complete their initial choice of program while others have terminated their initial study and switched to another post-secondary program (Parkin & Baldwin, 2009). If students are better prepared for post-secondary education and they select programs that better fit with their aptitude and career interests, the number of partial completions and program switching could be lowered. Indeed, recent research has found that a personality trait called "conscientiousness" – staying organized, working hard, and persisting – identifies students who make the most efficient transitions to college (Beattie, Laliberte, & Oreopoulos, 2016). BC AVID promotes the adoption of the behaviours associated with this trait – effective learning strategies and classroom practices. Plausibly then, BC AVID participants may experience outcomes associated with increased conscientiousness, including better academic performance, post-secondary persistence, and program completion.

This report examines the long-term impacts on post-secondary outcomes by obtaining updated postsecondary records for participants in the BC AVID Pilot Project. This study makes use of the same statistical model as the impact analyses for short-term outcomes previously used, now with the inclusion of long-term post-secondary outcomes. This project aims to answer the following research questions:

- 1. Did the offer of BC AVID improve academic performance and post-secondary outcomes of participants, in terms of post-secondary enrolment, persistence, and graduation from public college or university program, in the ten years after the random assignment of program groups, compared to statistically identical students?
- 2. Are there any key differences in the postsecondary impacts of offering BC AVID, in the ten years after the random assignment of program groups, across key subgroups of students: defined by (for example) student's gender, Grade 7 test scores, parents' educational level, and family income?
- 3. Are there any differences in the impacts of offering BC AVID on long-term post-secondary outcomes among participants who participate in AVID activities in all four academic years (Grades 9 to 12)?

The last question is answered through an extension of the exposure analysis included in Appendix 7 of the post-secondary impacts report (Ford et al., 2014).

As the project's design and implementation phases are over, this report concentrates on presenting updated impacts on post-secondary outcomes (from year 6 to year 10), drawn from administrative data. The Student Transitions Project at the BC Ministry of Advanced Education supplied the postsecondary outcome data from administrative records for analysis. These were linked to earlier supplied K-12 school records supplied by BC's Ministry of Education and survey and program data collected by SRDC. The report does not update evidence on apprenticeship and private vocational college included in earlier report since new data on such these programs are not well captured from Ministry of Advanced Education's administrative records.

This report is primarily focused on the presentation of the intervention' impacts. The next section provides an overview of the *BC AVID Pilot Project* research sample and outcomes of interest. Sections 3 presents the post-secondary impacts followed, in section 4, by the results from the exposure analysis. Section 5 concludes the report with a summary of the findings.

Overview of BC AVID's research samples and outcomes of interest

Research samples

Recruitment for BC AVID Pilot Project took place over two years in order to secure a sufficiently large sample of participants to detect policy-relevant impacts. As a result, students in two successive Grade 9 years were recruited in 2005 and 2006 and became part of either Cohort 1 or Cohort 2, respectively. The report uses the term "relative year #" to refer to the equivalent academic year reached by each cohort in its educational experience. Table 1 shows the correspondence between the academic and "relative years" used in this report.

	Relative years/Grade				
Academic year	Cohort 1	Cohort 2			
2004/05	Grade 8	Grade 7			
2005/06	Relative year 1= high school year 1 (i.e., Grade 9)	Grade 8			
2006/07	Relative year 2= high school year 2 (i.e., Grade 10)	Relative year 1= high school year 1 (i.e., Grade 9)			
2007/08	Relative year 3= high school year 3 (i.e., Grade 11)	Relative year 2= high school year 2 (i.e., Grade 10)			
2008/09	Relative year 4= high school year 4 (i.e., Grade 12)	Relative year 3= high school year 3 (i.e., Grade 11)			
2009/10	Relative year 5= PSE year 1	Relative year 4= high school year 4 (i.e., Grade 12)			
2010/11	Relative year 6= PSE year 2	Relative year 5= PSE year 1			
2011/12	Relative year 7= PSE year 3	Relative year 6= PSE year 2			
2012/13	Relative year 8= PSE year 4	Relative year 7= PSE year 3			
2013/14	Relative year 9= PSE year 5	Relative year 8= PSE year 4			
2014/15	Relative year 10= PSE year 6	Relative year 9= PSE year 5			
2015/16		Relative year 10= PSE year 6			

Table 1	Alignment of aca	demic year, relative	year, and data coverage
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In a process described fully in the Early Implementation Report, 1,671 Grade 8 students applied to join the BC AVID Pilot Project during the 2004–05 and 2005–06 school years. Of these, 1,522 were determined to be AVID-eligible and became project participants. At random-assignment sites, SRDC randomly assigned the 1,348 project participants into one of three groups — program, control, and

waiting list. Those in the program group were immediately offered a place in the AVID elective. Students randomly assigned to a control group would never be offered a place in AVID. The remaining students (about 103) were assigned to the waiting list. A few students withdrew from the study. For the current study, the analysis sample is composed of the AVID and control groups students at the random-assignment sites who have not withdrew from the study. There are 791 students in AVID group and 450 students in the control group.

Even with random assignment, some small differences in characteristics are possible (due to random sampling variability). These small differences can affect the level of certainty researchers have when they detect differences in outcomes that they are due to the intervention (rather than due to the chance variation). The baseline characteristics of the statistically-equivalent groups resulting from the assignment in each of the planned contrasts have been compared in previous analyses and not repeated for this report. In a nutshell, there are no significant differences between experimental groups based on virtually all baseline characteristics. The research team followed a standard procedure to minimize the influence of any remaining chance differences on the precision of impact estimates in this report. These and other steps taken to increase precision and accuracy.

Sub-group definitions

The project seeks to determine the differential impacts of BC AVID on students. These were identified at the outset. Specifically, the impact results of the report are broken down across the following sub-groups:

- Boys and girls;
- A "First generation" family (FGF) sub-group that comprises students whose parents have no
 post-secondary experience at all (that is, the highest education level of both parents at baseline
 was "high school or less"). FGF and non-FGF are included in tables to preserve continuity from
 earlier reports and comparability with other researchers' work, but impacts for FGF are not
 discussed in the text;
- The lowest income quartile sub-group comprises students whose family income is the in bottom 25 per cent of sample members;
- Grade 7 FSA numeracy score sub-groups divide students either into 4 quartiles or 2 halves based on the score from a standardized test at the end of elementary schooling;
- Grade 7 FSA reading comprehension sub-groups;
- Grade 7 FSA writing sub-groups; and
- The student cohort sub-groups is a proxy measure to capture one set of differences in implementation when schools met AVID standards more often for the second cohort.

In addition to the above well-defined sub-groups based on pre-existing characteristics, additional non-experimental analyses of the invention's effects has been conducted separately on the sub-samples of BC AVID program participants based on their levels of exposure to AVID treatments.

Outcomes of interest

The outcomes of interest cover ten relative years (i.e., 10 years after random assignment). The tenth relative year would "normally" be the sixth year of post-secondary studies, assuming continuous school attendance and progression to post-secondary education. However, some students may still have been in secondary education in the sixth and later relative years if they took more than one year to complete any of Grade 9, Grade 10, Grade 11, or Grade 12. Some students would also be working or unemployed in these years. There are 12 types of outcomes of interest to be discussed in the results sections below:

- **Enrolment in university and college:** denotes enrolment by academic year in any public university level (Bachelors or post-graduate degrees) and college level programs in British Columbia. Enrolments are analyzed separately for each relative year as well as cumulatively for the entire period;
- **Enrolment in university:** denotes enrolment by academic year in any public university level (Bachelors or post-graduate degrees) programs in British Columbia. Enrolments are analyzed separately for each relative year as well as cumulatively for the entire period;
- **Enrolment in college:** denotes enrolment by academic year in any public college level programs in British Columbia. Enrolments are analyzed separately for each relative year as well as cumulatively for the entire period;
- Graduation from university or college: denotes graduation from a public university or college program in British Columbia. Graduation rates are analyzed separately as well as cumulatively for the entire period. A student was counted as having graduated in a year if she or he graduated at any point up to the anniversary of enrolment;
- **Graduation from university:** denotes graduation from a public university program in British Columbia;
- **Graduation from college:** denotes graduation from a public college program in British Columbia;
- Continuing studies in university or college: inspired by Finnie and Qiu (2009), this variable denotes students who in a given academic year had not graduated but who were enrolled in a public university or college program in British Columbia, regardless of whether enrolment was at the same institution or not.² The rates are analyzed separately for each relative year. Since the annual indicator derived for analysis is not conditional on previous enrolment, holding the status of two or more years "continuing studies" would capture all incidences of continuing studies as well as the cases when the student resumed studies following a break from studying. SRDC decided not to examine in detail a related conditional year-by-year outcome derived

² It should be noted that this definition differs from Finnie and Qiu (2009) who defines continuer in a given year as a student who "had not graduated but was identified as still <u>being enrolled at the original institution</u> at the end of the reporting year in question." Furthermore, the authors define "continuing" with respect to *institution* rather than *program*.

indicator – continuing studies in university or college into the next academic year (conditional on current year's enrolment) – even though it would help to demonstrate year-by-year transitional outcomes. Such a conditional indicator would be too narrowly defined to present a complete picture of student persistence;

- **Continuing studies in university:** this variable denotes students who in a given academic year had not graduated but who were enrolled in a public university program in British Columbia, regardless of whether enrolment was at the same institution or not;
- **Continuing studies in college:** this variable denotes students who in a given academic year had not graduated but who were enrolled in a public college program in British Columbia, regardless of whether enrolment was at the same institution or not;
- Leaving/dropping out of university or college: inspired by Finnie and Qiu (2009), this variable denotes, in a given academic year, students who have left any public university or college program in British Columbia before graduating (this could include students who nonetheless eventually return to post-secondary education at a later date). In the context of BC AVID, the expectation is that students in AVID group would be less likely to be leavers or dropouts, since they would have had more determination to continue studying to achieve their ultimate credential, even if this involved switching between institutions following the achievement of an initial credential. Very high impacts on enrolment could nonetheless lead to more leavers in the whole sample. In this event, the interventions would be expected to have produced a lower proportion of leavers among all those ever enrolled in post-secondary education;
- **Leaving/dropping out of university:** this variable denotes, in a given academic year, students who have left any public university program in British Columbia before graduating;
- **Leaving/dropping out of college:** this variable denotes, in a given academic year, students who have left any public college program in British Columbia before graduating;
- Switching institutions: inspired by Finnie and Qiu (2009), this variable denotes students who in a given academic year had switched institution (university or a college).³ The rates are analyzed separately for each relative year as well as cumulatively for the entire period. In the context of BC AVID, the expectation is that students in AVID group may switch less often, since they would have had sufficient information and academic skills to make a firm decision about their post-secondary education and cope with the academic demand. However, since associate degrees are common in BC's postsecondary education system, students in AVID group may also switch more often if they enrolled in a bachelor's degree program in another institution after their associate degree.

There is a discrepancy in the analysis between the original BC AVID project definition of postsecondary enrolment and the reported "university and college" enrolment in this report. The original BC AVID project made use of both survey data and administrative data to create indicators

³ Finnie and Qiu (2009) also define "switching" with respect to institutions.

of all types of post-secondary enrolment. For this report, the post-secondary participation indicators are derived from administrative data only. Although administrative data contain accurate information on postsecondary enrolment, they are incomplete. First, students who attend private career colleges or vocational institutes (about 6 per cent) or who are registered apprentices (about 7 per cent) would not be fully covered by the available administrative data (an exception is registered apprentices who attended a college). Second, students of colleges and universities outside British Columbia would not be included in the analysis. However, these post-secondary outcomes are not that important for the BC AVID Pilot Project. Private institution programs and apprentices offer very hands-on vocational training that may be less impacted by the BC AVID curriculum. Also, only a very small percentage of students choose post-secondary education outside the province. The earlier 66-month survey had a question on the location of the university and college participants enrolled in: of reported college students, 93.8 per cent always studied in BC; of reported university students, 94 per cent always studied in BC. The differences in the survey between raw program and control group were all within 2 percentage points. Therefore, even though administrative data cover only public postsecondary enrolment in BC, they represent the data source providing the most relevant information by which to measure the outcomes of the program.

Post-secondary impacts of BC AVID

Ford et al. (2014) found small impacts of BC AVID on university or college enrolment five years after random assignment that were not statistically significant. Students offered the BC AVID program were more likely to report they were expecting to start PSE in the final survey. With only one potential postsecondary academic year observed, the previous analysis was not able to examine PSE graduation or persistence, and delayed enrolment was not captured in the available data.

Figure 1 presents the annual proportions of participants enrolled in a university program by year and program group. The solidly-shaded bars represent the proportions among students offered BC AVID, while the shaded bars represent the proportions of the control group. For each year before year 10, the enrolment is further broken down by transition status: either completing studies, continuing studies on into the next academic year, or leaving the study. The estimated impacts, for each status, are presented in numbers on the figure. Figure 2 presents the annual proportions of participants enrolled in a community college program. For reference, year 1 is equivalent to Grade 9.

In general, Figures 1 and 2 show that some students started their studies one year or more after graduating high school (in year 4), as enrolments in university increased in year 8 while enrolments in college peaked in year 6. There were signs that university persistence improved under BC AVID since a slightly higher proportion of students continue into the next year every year (though this increase is not statistically significant in any year) among university students. There were mixed results for continuing community college studies into the next year, which could be caused by program upgrading: about eight per cent of BC AVID participants switched from community college to university at one point during the ten year analysis period (results not shown). In BC, many associate degree course credits are transferrable to other programs and institutions. Some of BC's postsecondary institutions offer the junior year courses for bachelor's degree programs (classified as university level) as courses for their associate degree programs (classified as community college level). It is possible that some students started their study by registering as associate degree students and changed their registration to the equivalent bachelor's degree program before completing their associate degree; these students would show up as exiting from a community college program under this report's definition of leaving/dropping out.

Given the complexity of enrolment dynamics, examining BC AVID's overall impacts on enrolment, persistence and graduation over the full 10-year period since random assignment may demonstrate better how the offer of BC AVID affected PSE participation. Year by year impacts are presented graphically in Appendix A for reference. The following results concern impacts over the full 10-year period since random assignment comparing BC AVID participants in the program and control groups.



Figure 1 Annual enrolment and persistence in any university program by program group

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent.



Figure 2 Annual enrolment and persistence in any college program by program group

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups. **Notes:** Estimates regression adjusted. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent.

Impacts of offering BC AVID

Enrolment in university and college

Table 2 presents the estimated impacts of offering BC AVID on enrolments in any university or college level program in the 10 years since random assignment. Similarly to previous findings in Ford et al. (2014), the impact on enrolment in university and college was small and not significant in the full sample. Variation in impacts by subgroups is apparent, but these also were not statistically significant. However, because of the competing nature of university and college programs, further examination of impacts separately by university and college are necessary to fully understand the impact of offering the program to AVID-eligible students.

	AVID	Control		(Impact)
	Group	Group	Impact	(s.e.)
Enrolled in any university or college program from year 1 to year 10 (%)				
ALL	47.21	46.67	0.54	(2.92)
Gender				. ,
Boys	46.04	42.76	3.28	(4.28)
Girls	48.15	50.01	-1.86	(4.08)
Parents' Educational Attainment				. ,
Parents with high school or less (FGF)	42.44	46.27	-3.83	(3.80)
Parents with any PSE	54.19	48.40	5.79	(4.42)
Family Income				· · ·
Lowest quartile	46.31	50.64	-4.33	(6.49)
Upper three quartiles	49.08	51.11	-2.03	(3.62)
Grade 7 FSA numeracy score quartiles				. ,
First quartile	43.63	35.73	7.90	(7.26)
Second quartile	42.59	45.96	-3.37	(5.70)
Third guartile	47.33	45.17	2.16	(6.00)
Fourth quartile	52.97	58.16	-5.19	(5.85)
Grade 7 FSA numeracy score above/below median				· · ·
Below median	43.75	40.47	3.28	(4.21)
At or above median	50.73	51.14	-0.42	(4.08)
Grade 7 FSA reading comprehension, percent score quartiles				()
First quartile	40.99	37.72	3.27	(6.48)
Second guartile	38.61	41.55	-2.94	(7.23)
Third guartile	51.24	42.74	8.50	(5.48)
Fourth guartile	55.36	62.34	-6.98	(6.12)
Grade 7 FSA reading comprehension score above/below median				()
Below median	39.18	40.69	-1.50	(4.27)
At or above median	52.93	52.62	0.31	(4.11)
Grade 7 FSA writing score above/below median				· · ·
Below median	31.06	37.77	-6.71	(8.39)
At or above median	49.27	48.62	0.65	(3.20)
Student Cohorts				. ,
First Cohort	49.36	46.35	3.02	(3.78)
Second Cohort	44.44	46.89	-2.45	(4.53)
Sample size	791	450		. ,

Table 2 Impacts on enrolment in university and college

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups. **Notes:** Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Enrolment in university

Table 3 presents the estimated impacts of offering BC AVID on enrolments in any university level program in the 10 years since random assignment. Again, the estimated impacts were small,

positive and not statistically significant using the full sample. The impacts on various subgroups were also not statistically significant.

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Enrolled in any university program from year 1 to year 10 (%)				
ALL	22.18	21.09	1.09	(2.24)
Gender				
Boys	19.36	17.03	2.32	(3.42)
Girls	24.73	24.40	0.33	(3.08)
Parents' Educational Attainment				
Parents with high school or less (FGF)	18.82	17.12	1.71	(3.12)
Parents with any PSE	26.75	26.95	-0.20	(3.83)
Family Income				. ,
Lowest quartile	24.70	25.35	-0.65	(5.39)
Upper three quartiles	22.66	22.15	0.51	(3.14)
Grade 7 FSA numeracy score quartiles				· · · ·
First quartile	13.72	17.54	-3.82	(4.69)
Second guartile	17.63	17.49	0.13	(4.59)
Third guartile	21.76	16.58	5.19	(4.81)
Fourth guartile	30.47	32.36	-1.89	(5.67)
Grade 7 FSA numeracy score above/below median				()
Below median	17.04	15.48	1.57	(3.14)
At or above median	26.85	24.14	2.71	(3.59)
Grade 7 FSA reading comprehension, percent score quartiles				()
First quartile	13.04	9.19	3.85	(4.03)
Second quartile	14.88	13.33	1.54	(4.77)
Third quartile	19.30	22.08	-2.78	(4.58)
Fourth quartile	38.04	36.05	1.98	(5.76)
Grade 7 FSA reading comprehension score above/below median				(0.1.0)
Below median	13.83	11.07	2.75	(2.91)
At or above median	28.08	29.36	-1.28	(3.41)
Grade 7 FSA writing score above/below median				(0)
Below median	11.03	14.90	-3.87	(6.36)
At or above median	23.28	22.13	1.15	(2.45)
Student Cohorts	_00			()
First Cohort	23.87	22.26	1.61	(3.02)
Second Cohort	19.90	19.51	0.39	(3.50)
Sample size	791	450		()

Table 3 Impacts on enrolment in university

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Enrolment in community college

Table 4 presents the estimated impacts of offering BC AVID on enrolments in any college level program in the 10 years since random assignment. The impact on college enrolment was small negative and not statistically significant in the full sample. The impacts for many subgroups were also not statistically significant. However, it seems that BC AVID had a strong positive impact on college enrolment among students in the lowest quartile of Grade 7 FSA numeracy score (by 12.3 percentage points) while it had a strong negative impact among those in the highest quartile of numeracy score (by -11.3 percentage points). Compared to the pattern of impacts on enrolment in university, BC AVID might help more students with lower numeracy scores find a place in college (but not in university).

	AVID	Control		(Impact)
	Group	Group	Impact	(s.e.)
Enrolled in any college program from year 1 to year 10 (%)			-	
ALL	37.07	38.93	-1.86	(2.90)
Gender				
Boys	35.34	37.00	-1.66	(4.08)
Girls	38.58	40.50	-1.92	(4.10)
Parents' Educational Attainment				
Parents with high school or less (FGF)	34.95	39.79	-4.84	(3.84)
Parents with any PSE	40.34	38.61	1.73	(4.52)
Family Income				
Lowest quartile	34.12	40.70	-6.58	(6.60)
Upper three quartiles	38.38	43.53	-5.15	(3.47)
Grade 7 FSA numeracy score quartiles				
First quartile	37.77	25.51	12.26 *	(7.45)
Second quartile	38.68	39.78	-1.10	(5.47)
Third quartile	35.25	36.30	-1.05	(5.80)
Fourth quartile	37.55	48.85	-11.30 *	(5.67)
Grade 7 FSA numeracy score above/below median				
Below median	38.37	33.87	4.51	(4.14)
At or above median	36.43	42.62	-6.19	(4.05)
Grade 7 FSA reading comprehension, percent score quartiles				
First quartile	35.21	36.46	-1.25	(6.48)
Second quartile	32.52	36.87	-4.35	(6.83)
Third quartile	42.41	34.51	7.90	(5.51)
Fourth quartile	37.36	45.52	-8.16	(6.25)
Grade 7 FSA reading comprehension score above/below median				
Below median	33.31	37.87	-4.56	(4.27)
At or above median	39.73	40.13	-0.41	(3.86)

Table 4 Impacts on enrolment in community college

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Grade 7 FSA writing score above/below median				
Below median	26.69	30.26	-3.57	(8.27)
At or above median	38.47	40.44	-1.97	(3.15)
Student Cohorts				
First Cohort	39.09	37.10	1.99	(3.91)
Second Cohort	34.51	41.14	-6.63	(4.54)
Sample size	791	450		

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Graduation from university or college

Table 5 presents the impacts on graduation from any university or college program in the 10 years since random assignment. The overall impact was again small and not significant. However, there were signs that BC AVID improved the percentage who graduated postsecondary education among those with better Grade 7 numeracy and reading comprehension scores.

Table 5 Impacts on graduation from university or college	able 5	Impacts on	graduation	from	university	or co	llege
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	AVID Group	Control Group	Impact	(Impact) (s.e.)
Graduated from any university or college program from year 1 to year	ar 10 (%)			
ALL	22.07	21.78	0.29	(2.19)
Gender				
Boys	21.17	21.54	-0.37	(3.57)
Girls	22.66	22.35	0.31	(3.26)
Parents' Educational Attainment				
Parents with high school or less (FGF)	19.82	22.07	-2.24	(3.22)
Parents with any PSE	25.34	21.95	3.39	(3.62)
Family Income				
Lowest quartile	24.36	20.40	3.96	(5.52)
Upper three quartiles	22.77	23.02	-0.25	(2.97)
Grade 7 FSA numeracy score quartiles				
First quartile	17.77	15.01	2.76	(5.61)
Second quartile	21.08	31.24	-10.16 *	(5.60)
Third quartile	24.67	15.24	9.43 *	(5.07)
Fourth quartile	23.09	22.30	0.80	(5.48)
Grade 7 FSA numeracy score above/below median				
Below median	20.33	23.59	-3.25	(3.75)
At or above median	24.03	18.34	5.68 *	(3.21)

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Grade 7 FSA reading comprehension, percent score quartiles				
First quartile	18.51	22.88	-4.37	(4.91)
Second quartile	18.54	22.94	-4.40	(5.69)
Third quartile	25.62	20.85	4.77	(4.77)
Fourth quartile	24.61	17.59	7.02	(4.93)
Grade 7 FSA reading comprehension score above/below median				
Below median	17.89	23.84	-5.95 *	(3.42)
At or above median	25.06	19.52	5.54 *	(3.32)
Grade 7 FSA writing score above/below median				
Below median	14.31	12.87	1.44	(7.17)
At or above median	22.85	23.49	-0.64	(2.46)
Student Cohorts				
First Cohort	22.71	21.65	1.05	(2.83)
Second Cohort	21.81	20.80	1.02	(3.65)
Sample size	791	450		

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Graduation from university

Table 6 presents the estimated impacts of offering BC AVID on graduation from any university level program in the 10 years since random assignment. Again, the impact on small positive and not statistically significant in the full sample. Many of the impacts on various subgroups were also small and not statistically significant. However, offering BC AVID improved the proportion of students among those with above median Grade 7 numeracy score who graduated from university (by 5.6 percentage points). The increase in graduation among this group could be the result of positive effects on university enrolment (positive but not statistically significant) as well as improvement in persistence (examined in a later section).

	AVID	Control		(Impact)
	Group	Group	Impact	(s.e.)
Graduated from any university program from year 1 to year 10 (%)				
ALL	9.07	7.85	1.22	(1.57)
Gender				· · · ·
Boys	8.36	5.06	3.29	(2.17)
Girls	9.70	10.17	-0.48	(2.34)
Parents' Educational Attainment				· · · ·
Parents with high school or less (FGF)	6.61	4.98	1.63	(1.97)
Parents with any PSE	12.44	11.47	0.97	(2.87)
Family Income				· · · ·
Lowest guartile	10.79	6.45	4.34	(3.84)
Upper three quartiles	9.54	8.73	0.81	(2.19)
Grade 7 FSA numeracy score quartiles				· · · ·
First quartile	6.08	4.19	1.89	(3.08)
Second quartile	4.21	11.60	-7.39 ***	(2.85)
Third guartile	11.08	5.50	5.58	(3.44)
Fourth quartile	13.21	8.57	4.64	(3.96)
Grade 7 FSA numeracy score above/below median				· · · ·
Below median	5.75	7.29	-1.54	(1.93)
At or above median	12.40	6.85	5.56 **	(2.52)
Grade 7 FSA reading comprehension, percent score quartiles				· · · ·
First quartile	4.29	0.99	3.30 *	(1.88)
Second quartile	5.67	5.42	0.26	(3.14)
Third guartile	9.42	9.93	-0.51	(3.44)
Fourth guartile	15.61	12.77	2.83	(4.33)
Grade 7 FSA reading comprehension score above/below median				· · · ·
Below median	4.84	3.11	1.73	(1.63)
At or above median	12.34	11.50	0.84	(2.72)
Grade 7 FSA writing score above/below median				()
Below median	6.12	1.42	4.70	(2.96)
At or above median	9.34	8.86	0.48	(1.80)
Student Cohorts				· /
First Cohort	9.41	8.39	1.01	(2.04)
Second Cohort	9.05	6.28	2.76	(2.46)
Sample size	791	450		· /

Table 6 Impacts on graduation from university

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Graduation from community college

Table 7 presents the estimated impacts of offering BC AVID on graduation from any college level program in the 10 years since random assignment. The impact on college graduation was small negative and not statistically significant in the full sample. The impacts on many subgroups were also small and not statistically significant. However, BC AVID had a positive impact on college graduation among students scoring in the upper half of Grade 7 FSA reading comprehension scores (by 4.9 percentage points) while it also had a strong negative impact among those scoring in the lower half (by -7.6 percentage points). Since BC AVID's impacts on college enrolment followed a similar pattern (but not statistically significant), the results are consistent with the hypothesis that BC AVID improved the match of PSE programs to students' original ability, but also that AVID increased the chances that originally low-numeracy students were better equipped to complete college with skills acquired in the program.

	AVID	Control	Impact	(Impact)
	Oloup	Oloup	impact	(3.e.)
Graduated from any college program from year 1 to year 10 (%)				
ALL	14.62	15.62	-0.99	(1.94)
Gender				
Boys	14.78	17.60	-2.82	(3.18)
Girls	14.39	14.14	0.25	(2.65)
Parents' Educational Attainment				
Parents with high school or less (FGF)	13.88	18.33	-4.45	(2.91)
Parents with any PSE	15.56	12.93	2.63	(2.85)
Family Income				
Lowest quartile	14.33	14.45	-0.12	(5.14)
Upper three quartiles	15.57	15.75	-0.17	(2.48)
Grade 7 FSA numeracy score quartiles				
First quartile	13.69	10.64	3.06	(5.09)
Second quartile	18.54	23.14	-4.60	(5.14)
Third quartile	13.59	9.74	3.85	(4.21)
Fourth quartile	12.20	16.87	-4.67	(4.66)
Grade 7 FSA numeracy score above/below median				
Below median	16.66	17.85	-1.19	(3.26)
At or above median	12.99	12.97	0.02	(2.76)
Grade 7 FSA reading comprehension, percent score quartiles				
First quartile	15.60	21.40	-5.80	(4.88)
Second quartile	14.31	20.36	-6.05	(5.30)
Third quartile	17.41	13.54	3.87	(4.07)
Fourth quartile	11.93	5.35	6.58 *	(3.40)
Grade 7 FSA reading comprehension score above/below median				
Below median	14.34	21.94	-7.59 **	(3.22)
At or above median	14.69	9.84	4.85 *	(2.62)

Table 7 Impacts on graduation from college

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Grade 7 FSA writing score above/below median				
Below median	9.12	11.50	-2.38	(6.81)
At or above median	15.27	16.44	-1.17	(2.27)
Student Cohorts				
First Cohort	14.42	15.41	-0.99	(2.73)
Second Cohort	15.05	15.60	-0.56	(3.24)
Sample size	791	450		

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups. **Notes:** Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Continuing studies in university or college

Table 8 presents impacts on continuing studies in any university or college program for two or more years in the 10 years since random assignment. No impacts, whether for the full sample or the subgroup samples, were statistically insignificant. However, patterns and magnitudes were similar to the impacts on enrolments suggesting that any induced increase in enrolments was not likely to induce higher dropping out or more participation in short (1 year or shorter) programs.

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Continuing studies in any university or college program for tw	vo or more years (%)			-
ALL	36.55	35.80	0.76	(2.79)
Gender				
Boys	35.60	31.60	4.00	(3.93)
Girls	37.53	39.03	-1.50	(3.73)
Parents' Educational Attainment				
Parents with high school or less (FGF)	32.79	33.65	-0.87	(3.72)
Parents with any PSE	42.12	39.32	2.80	(4.36)
Family Income				
Lowest quartile	37.87	42.86	-4.99	(6.48)
Upper three quartiles	37.25	37.80	-0.55	(3.53)
Grade 7 FSA numeracy score quartiles				
First quartile	36.05	26.50	9.56	(6.89)
Second quartile	29.81	34.06	-4.25	(5.75)
Third quartile	35.12	36.50	-1.38	(5.61)
Fourth quartile	42.12	46.36	-4.23	(6.17)

Table 8 Impacts on continuing studies in university or community college

	AVID	Control		(Impact)
	Group	Group	Impact	(s.e.)
Grade 7 FSA numeracy score above/below median				
Below median	33.37	29.37	4.00	(4.01)
At or above median	39.42	40.70	-1.28	(4.16)
Grade 7 FSA reading comprehension, percent score quartiles				
First quartile	26.23	28.08	-1.85	(6.20)
Second quartile	29.38	27.35	2.03	(6.35)
Third quartile	39.62	34.59	5.03	(5.65)
Fourth quartile	46.84	51.34	-4.50	(5.89)
Grade 7 FSA reading comprehension score above/below median				
Below median	27.27	28.39	-1.12	(4.19)
At or above median	42.98	42.84	0.14	(3.96)
Grade 7 FSA writing score above/below median				
Below median	23.58	29.02	-5.44	(7.96)
At or above median	37.86	37.49	0.36	(3.14)
Student Cohorts				
First Cohort	39.00	34.06	4.94	(3.59)
Second Cohort	33.51	37.69	-4.18	(4.22)
Sample size	791	450		

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups. **Notes:** Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Continuing studies in university

Table 9 presents the estimated impacts of offering BC AVID on continuing studies in any university level program for two or more years in the 10 years since random assignment. Again, the impact was small positive and not statistically significant in the full sample. Very few impacts on subgroups were statistically significant. It seemed that BC AVID improved university persistence among students scoring in the third quartile of Grade 7 FSA numeracy scores (by 8.0 percentage points). Since BC AVID also improved university enrolment for the same subpopulation (though the estimated impact was not statistically significant), the results were consistent with the notion that BC AVID improved the match of students with originally higher numeracy scores to university programs.

	AVID	Control		(Impact)
	Group	Group	Impact	(s.e.)
Continuing studies in any university program for two or more years (%)				
ALL	18.62	17.67	0.95	(2.15)
Gender				
Boys	17.34	14.56	2.78	(3.25)
Girls	19.90	20.03	-0.13	(2.93)
Parents' Educational Attainment				
Parents with high school or less (FGF)	15.18	15.03	0.16	(2.90)
Parents with any PSE	23.27	21.80	1.47	(3.66)
Family Income				
Lowest quartile	21.44	21.04	0.40	(5.36)
Upper three quartiles	18.79	17.72	1.06	(3.00)
Grade 7 FSA numeracy score quartiles				
First quartile	9.28	14.53	-5.25	(4.62)
Second quartile	13.27	16.01	-2.74	(4.35)
Third quartile	19.84	11.84	7.99 *	(4.19)
Fourth quartile	27.42	27.22	0.20	(5.57)
Grade 7 FSA numeracy score above/below median				. ,
Below median	12.43	13.76	-1.33	(2.94)
At or above median	24.22	19.32	4.90	(3.48)
Grade 7 FSA reading comprehension, percent score quartiles				. ,
First quartile	8.47	7.60	0.87	(3.59)
Second quartile	12.12	10.47	1.66	(4.48)
Third guartile	17.41	19.76	-2.35	(4.52)
Fourth quartile	32.70	30.20	2.51	(5.45)
Grade 7 FSA reading comprehension score above/below median				. ,
Below median	10.20	8.68	1.52	(2.60)
At or above median	24.62	25.19	-0.58	(3.29)
Grade 7 FSA writing score above/below median				. ,
Below median	11.22	13.09	-1.87	(6.45)
At or above median	19.22	18.49	0.73	(2.31)
Student Cohorts				. /
First Cohort	20.43	18.41	2.02	(2.85)
Second Cohort	16.22	16.62	-0.40	(3.32)
Sample size	791	450		. , ,

Table 9 Impacts on continuing studies in university

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Continuing studies in community college

Table 10 presents the estimated impacts of offering BC AVID on continuing studies in any college level program for two or more years in the 10 years since random assignment. The impact was small and not statistically significant in the full sample. The impacts for most subgroups were not statistically significant. However, similar to the impacts on college enrolment, BC AVID had a strong positive impact on college persistence among students in the lowest quartile of Grade 7 FSA numeracy score (by 18.1 percentage points) and negative but not statistically significant impacts among those in with higher numeracy score. Again, this result suggests that BC AVID may have increased the match of students with originally lower numeracy scores to college programs, or simply equipped them with the skills to persist in their studies. There were also signs of differential impact by cohorts.

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Continuing studies in any college program for two or more years (%)				
ALL	24.88	24.65	0.23	(2.64)
Gender				
Boys	23.76	21.21	2.55	(3.45)
Girls	25.99	27.25	-1.25	(3.65)
Parents' Educational Attainment				
Parents with high school or less (FGF)	23.21	24.13	-0.92	(3.49)
Parents with any PSE	27.57	25.83	1.74	(4.15)
Family Income				
Lowest quartile	22.58	26.56	-3.98	(5.69)
Upper three quartiles	25.72	26.96	-1.24	(3.33)
Grade 7 FSA numeracy score quartiles				
First quartile	31.33	13.27	18.06 ***	(6.55)
Second quartile	24.16	24.53	-0.37	(5.30)
Third quartile	23.10	25.43	-2.33	(5.65)
Fourth quartile	23.13	31.34	-8.21	(5.48)
Grade 7 FSA numeracy score above/below median				
Below median	27.16	20.12	7.04 *	(3.77)
At or above median	22.88	28.70	-5.81	(3.96)
Grade 7 FSA reading comprehension, percent score quartiles				
First quartile	19.77	23.68	-3.90	(6.20)
Second quartile	23.05	20.92	2.13	(6.07)
Third quartile	29.65	24.33	5.33	(5.45)
Fourth quartile	25.76	27.60	-1.83	(5.58)
Grade 7 FSA reading comprehension score above/below median				
Below median	20.91	23.08	-2.17	(4.24)
At or above median	27.56	26.31	1.25	(3.64)

Table 10 Impacts on continuing studies in community college

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Grade 7 FSA writing score above/below median				
Below median	17.30	19.65	-2.35	(7.30)
At or above median	25.67	25.78	-0.10	(2.89)
Student Cohorts				
First Cohort	27.22	21.07	6.14 *	(3.54)
Second Cohort	22.00	29.02	-7.02 *	(4.09)
Sample size	791	450		

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups. **Notes**: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are

indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Leaving/dropping out of university or college

Table 11 presents the impacts on leaving or dropping out from any university or college program in the 10 years since random assignment. The impacts, regardless of the full sample or the subgroup samples, were not statistically significant, with the exception that BC AVID had a statistically significant negative impact on the drop-out rate among the second cohort students (by -8.3 percentage points).

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Leaving/dropping out from any university or college program from year 1	I to year 1	0 (%)		
ALL	26.70	27.22	-0.52	(2.67)
Gender				
Boys	24.62	24.72	-0.10	(3.73)
Girls	28.53	29.28	-0.75	(3.81)
Parents' Educational Attainment				
Parents with high school or less (FGF)	24.62	27.45	-2.83	(3.11)
Parents with any PSE	30.08	27.54	2.55	(4.37)
Family Income				
Lowest quartile	23.49	31.60	-8.11	(5.85)
Upper three quartiles	27.26	30.93	-3.66	(3.47)
Grade 7 FSA numeracy score quartiles				
First quartile	26.41	20.89	5.52	(7.07)
Second quartile	21.30	20.50	0.80	(5.24)
Third quartile	25.76	26.42	-0.66	(6.06)
Fourth quartile	33.47	39.15	-5.69	(5.36)

Table 11 Impacts on leaving/dropping out of university or college

	AVID	Control		(Impact)
	Group	Group	Impact	(s.e.)
Grade 7 FSA numeracy score above/below median				
Below median	23.23	20.98	2.25	(4.13)
At or above median	29.81	33.18	-3.37	(3.98)
Grade 7 FSA reading comprehension, percent score quartiles				
First quartile	24.04	20.39	3.65	(5.08)
Second quartile	21.40	21.15	0.25	(5.43)
Third quartile	26.18	25.33	0.86	(5.00)
Fourth quartile	34.82	39.32	-4.50	(6.28)
Grade 7 FSA reading comprehension score above/below median				
Below median	22.58	21.19	1.39	(3.57)
At or above median	30.09	32.60	-2.51	(3.78)
Grade 7 FSA writing score above/below median				
Below median	19.12	27.62	-8.50	(7.91)
At or above median	27.81	27.42	0.39	(3.12)
Student Cohorts				
First Cohort	28.19	24.11	4.07	(3.37)
Second Cohort	24.17	32.44	-8.27 **	(3.95)
Sample size	791	450		

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups. **Notes:** Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Leaving/dropping out of university

Table 12 presents the impacts on leaving or dropping out from any university program in the 10 years since random assignment. The reduction in proportion who dropped out from university was not statistically significant in the full sample. There were some signs of positive effects from offering BC AVID. First, despite no substantial change in university enrolments among students in the lowest quartile of family income, there was a substantial reduction, by 9.2 percentage points, in the proportion who dropped out from a university study. BC AVID helped lower-income students to persist in their university studies. The reduction in the proportion who dropped out among those scoring in the lowest quartile of numeracy scores was expected given that there was reduced university enrolment in this subgroup. There were also reductions in the proportions of university drop-outs among students scoring in the lower half of Grade 7 writing scores as well as students in the second cohort.

	AVID Group	Control Group	Impact	(Impact) (s.e.)
	Cicup	ereap	mpuor	(0.01)
Leaving/dropping out from any university program from year 1 to year 10) (%)			
ALL	8.90	10.52	-1.62	(1.71)
Gender				
Boys	8.51	9.84	-1.33	(2.60)
Girls	9.28	10.98	-1.69	(2.32)
Parents' Educational Attainment				
Parents with high school or less (FGF)	7.08	9.22	-2.15	(2.13)
Parents with any PSE	11.21	13.13	-1.92	(3.02)
Family Income				
Lowest quartile	6.66	15.85	-9.20 **	(3.86)
Upper three quartiles	9.87	10.13	-0.26	(2.40)
Grade 7 FSA numeracy score quartiles				. ,
First quartile	3.37	10.44	-7.07 *	(4.21)
Second quartile	6.48	6.64	-0.16	(3.17)
Third guartile	8.38	5.04	3.34	(3.04)
Fourth guartile	15.00	19.09	-4.09	(4.80)
Grade 7 FSA numeracy score above/below median				()
Below median	5.24	7.93	-2.69	(2.41)
At or above median	11.86	12.54	-0.67	(2.76)
Grade 7 FSA reading comprehension, percent score guartiles				()
First quartile	4.74	7.48	-2.74	(2.94)
Second guartile	3.74	7.41	-3.68	(3.22)
Third guartile	6.27	7.47	-1.20	(2.78)
Fourth guartile	18.27	19.47	-1.20	(4.81)
Grade 7 FSA reading comprehension score above/below median				()
Below median	4.49	7.04	-2.55	(2.10)
At or above median	11.74	13.89	-2.15	(2.69)
Grade 7 FSA writing score above/below median				()
Below median	3.51	14.11	-10.60 *	(5.76)
At or above median	9.31	10.26	-0.95	(1.87)
Student Cohorts				× /
First Cohort	9.68	9.91	-0.23	(2.26)
Second Cohort	7.58	11.88	-4.31 *	(2.56)
Sample size	791	450		

Table 12 Impacts on leaving/dropping out of university

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups. **Notes:** Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Leaving/dropping out of community college

Table 13 presents the impacts on leaving or dropping out from any college program in the 10 years since random assignment. The reductions in the proportion who dropped out from college were not

statistically significant in the full sample and most subgroups. The reduction in the proportion who dropped out among students scoring in the highest quartile of reading comprehension score (by -9.5 percentage points) mirrored the positive significant impacts on college graduation.

	AVID Group	Control Group	Impact	(Impact) (s.e.)
Leaving/dropping out from any college program from year 1 to year 10 (%)			
ALL	24.40	25.25	-0.85	(2.53)
Gender				
Boys	20.99	20.51	0.48	(3.42)
Girls	27.42	29.16	-1.74	(3.62)
Parents' Educational Attainment				
Parents with high school or less (FGF)	22.81	25.21	-2.40	(3.19)
Parents with any PSE	27.19	25.60	1.58	(4.27)
Family Income				(<i>'</i>
Lowest guartile	24.22	28.20	-3.98	(6.05)
Upper three quartiles	23.94	28.69	-4.75	(3.18)
Grade 7 FSA numeracy score quartiles				()
First guartile	27.34	19.75	7.59	(7.14)
Second quartile	20.76	20.48	0.28	(4.97)
Third guartile	23.93	25.16	-1.23	(5.62)
Fourth quartile	27.10	33.26	-6.16	(5.01)
Grade 7 FSA numeracy score above/below median				
Below median	23.56	20.11	3.45	(3.88)
At or above median	25.11	30.10	-4.99	(3.50)
Grade 7 FSA reading comprehension, percent score quartiles	-			()
First quartile	22.36	18.85	3.50	(5.03)
Second quartile	21.85	18.25	3.60	(5.65)
Third quartile	27.02	24.89	2.13	(5.17)
Fourth quartile	26.46	35.95	-9.49 *	(5.58)
Grade 7 FSA reading comprehension score above/below median				(0.00)
Below median	21.74	19.35	2.40	(3.58)
At or above median	26.63	30.29	-3.65	(3.52)
Grade 7 FSA writing score above/below median	_0.00	00.20	0.00	(0.0_)
Below median	18.97	21.49	-2.52	(7.94)
At or above median	25.03	26.11	-1.08	(2.92)
Student Cohorts	'	-		
First Cohort	25.87	23.97	1.91	(3.32)
Second Cohort	22.27	27.34	-5.07	(3.82)
Sample size	791	450	-	

Table 13 Impacts on leaving/dropping out of college

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Switching institutions

Table 14 presents the impacts on switching PSE institutions in the 10 years since random assignment. No estimated impacts in the full sample and subgroups were statistically significant.

Table 14	Impacts on	switching	institutions
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	AVID	Control		(Impact)
	Group	Group	Impact	(s.e.)
Switched institutions once or more from year 1 to year 10 (%)			-	
ALL	14.65	13.79	0.86	(2.01)
Gender				
Boys	14.47	13.93	0.54	(3.22)
Girls	14.79	13.73	1.06	(2.73)
Parents' Educational Attainment				
Parents with high school or less (FGF)	13.08	12.06	1.01	(2.54)
Parents with any PSE	16.62	16.78	-0.16	(3.23)
Family Income				. ,
Lowest quartile	14.27	14.21	0.06	(4.42)
Upper three quartiles	16.09	14.07	2.02	(2.68)
Grade 7 FSA numeracy score quartiles				. ,
First quartile	11.98	14.95	-2.97	(5.36)
Second quartile	15.43	15.86	-0.44	(4.45)
Third quartile	11.49	9.72	1.76	(3.69)
Fourth quartile	19.21	12.51	6.70	(4.76)
Grade 7 FSA numeracy score above/below median				. ,
Below median	14.50	14.56	-0.06	(3.15)
At or above median	15.31	11.98	3.33	(2.89)
Grade 7 FSA reading comprehension, percent score quartiles				. ,
First quartile	10.97	10.82	0.15	(4.26)
Second guartile	9.99	16.33	-6.34	(4.42)
Third quartile	13.83	12.89	0.94	(3.93)
Fourth quartile	22.26	14.59	7.67	(5.29)
Grade 7 FSA reading comprehension score above/below median				()
Below median	10.59	13.20	-2.61	(2.92)
At or above median	17.70	14.20	3.50	(3.05)
Grade 7 FSA writing score above/below median				()
Below median	11.96	16.89	-4.94	(7.02)
At or above median	14.93	13.43	1.51	(2.24)
Student Cohorts				()
First Cohort	16.30	15.61	0.69	(2.69)
Second Cohort	12.50	11.26	1.25	(2.58)
Sample size	791	450		/

Sources: BC Ministry of Advanced Education STP Data. BC AVID Baseline survey and school records data to define sub-groups.

Notes: Estimates regression adjusted. Sample sizes vary for individual measures because of missing values. Statistical significance levels are indicated as * = 10 per cent; ** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Exposure analysis

In the above experimental impact analysis, the impacts of making BC AVID available to eligible (i.e., "middle-achieving") students have been estimated based on an intention-to-treat (ITT) model. An ITT analysis provides the most realistic estimates of a voluntary program's average impacts on those who policy makers want to help since it includes the effects of realistic participant reactions to a program being offered such as attrition and non-compliance as well as substituting or compensating activities they may engage in (such as not taking another elective). However, ITT analysis does not directly evaluate full exposure to the intended treatment on those who could receive it. Most evaluation techniques, including randomized controlled trials, are not able to provide unbiased estimates of the effects of treatment on the treated without making strong additional assumptions, because compliance with the treatment is rarely random. Program group members offered a program like BC AVID vary in how much they will participate in the program such that those who participate a lot are nearly always systematically different from those who participate a little. In such circumstances, selectively considering only the subset of program participants predisposed to high exposure without making a corresponding adjustment to compare them against an equivalently select subset of the control group will result in biased impact estimates. However, it is crucial to control for compliance in order to understand whether the intervention is effective among those predisposed to high exposure. It may be possible to redesign the participant selection process or delivery mechanism to improve participation compliance, but the improvement effort is only worthwhile if the program is most effective among those receiving the full exposure.

Quite plausibly those motivated to obtain the most exposure to a new program may be those predisposed to achieving the outcome even without the new program. For the program to be effective, however, it needs to *change* outcomes, i.e., convert those not otherwise destined for PSE into PSE attendees. While the offer of BC AVID does not seem to have changed PSE outcomes markedly on average for those eligible, if it was found to change outcomes for those with high exposure, a case could be made to try to increase exposure among other students, specifically those not destined for PSE and not normally pre-disposed to participate extensively in BC AVID. Therefore, it is informative to attempt to estimate the impacts on students with high exposure to AVID activities, i.e., the treatment effects on the treated.

Compliance with the BC AVID treatment was not high in the BC AVID Pilot Project. Only 41.1 per cent of students eligible for and offered a place in BC AVID participated in AVID activities in each of four program years (Grades 9, 10, 11, and 12). In other words, more than half of the program group did not participate in all the activities that BC AVID was offering to them. This analysis concerns those who complied with the program and participated in most (if not all) program activities on a regular basis and determines whether the program might have produced larger impacts on PSE enrolment within this group.

For this analysis, high program high program exposure (or compliance) is defined as spending time in AVID elective class activities in each of the four program years. Such high exposure to AVID activities was not randomly distributed among AVID students. For example, one participating BC AVID site-cohort had no student meet this definition of high exposure.⁴ As a result, some of the cohort subgroup differences in impacts as found in last section may be attributable to exposure differences among AVID students.

Of course, program exposure cannot be measured among control group members. Certainly, outcomes from the entire control group sample would not provide a valid counterfactual experience against which to compare outcomes of members of the program group with high exposure. A non-experimental impact evaluation method is needed to identify a comparable counterfactual sample of *potentially* high-exposure students from within the control group, equivalent to the high exposure students in the program group.

Method

Jo and Stuart (2009) showed that it is possible to apply the propensity score matching (PSM) method to estimate impacts on those who complied with the treatment under two conditions. The conditional independence assumption (CIA) and the principal ignorability (PI) assumption must be satisfied. The CIA assumes that there will be no systematic differences in potential outcomes between compliers and non-compliers once pre-treatment characteristics (called "covariates") are controlled for. The PI assumption requires that principal strata membership (belonging to a group of participants with a similar propensity to comply) is conditionally independent of the potential outcome given the pre-treatment covariates. In other words, there should be no differences in the potential outcomes across principal strata given the observed pre-treatment covariates. Furthermore, in a randomized controlled trial like the BC AVID Pilot Project, it is possible to estimate the propensity score of compliance using an estimated model based on the treatment sample observations and to construct a matched control group sample using control group observations. In practice, the control group sample is reweighted such that it resembles the treatment *compliers* in the treatment group.

It should be noted that propensity score matching does not provide unbiased estimates if selection into treatment is related to unobserved differences between the treatment and control group. In the case of BC AVID, if the high exposure group comprised students possessing certain unobserved characteristics (for example, a pre-existing attachment to school or to studying, not captured in the survey measures) that were not possessed by the low-exposure group and if the potential outcome (in this case PSE enrolment) was related to these unmeasured characteristics, the conditional independence assumption would be violated and the estimated difference would be biased. Unfortunately, the existence of such a condition cannot be known and so the presence of such potential for bias is not testable. In sum, the PSM will only provide unbiased estimates when all systematic differences between high exposure and low exposure groups are only related to observable characteristics that are included in the propensity score estimation. While the BC AVID Pilot Project captured very rich baseline data that are quite likely to capture most of the

⁴ The site that had no high exposure student did not participate in the second cohort. Students from larger families (with four or five people) were significantly more likely to participate in all four years of AVID programming.
characteristics that predispose sample members to vary their exposure, it is impossible analytically to rule out the influence of some unmeasured factor. The analysis sample is thus constructed with great care to minimize this risk, but it represents one of the main limitations of this model.

This part of exposure analysis applies the same sample construction method as described in Appendix 7 of Ford et al. (2014). Observations of the site-cohorts (meaning annual intake cohorts followed by the study from Grade 8 onwards at each school) where no student had high program exposure were excluded from the estimations since PSM is only valid if the propensity is neither precisely zero nor precisely one. As a result, only 761 AVID program group observations (out of the original 791) and 430 control group observations (out of the original 450) can be used in this study. Out of the 761 students in the AVID program group, 325 were classified as high exposure (42.7 per cent).

A logistic regression model was used to estimate a propensity to experience high exposure for each student in the program and control groups. Students predicted as most likely to have high exposure received higher propensity scores. In this analysis, high exposure was regressed on a wide range of the student's baseline characteristics: gender, aboriginal status, English as secondary language status, average letter grade during Grade 8, family income, parent's post-secondary education participation, single parent status, self and parent's expectation of PSE attendance, family size, and site-cohort identifier. The estimated propensity score model had good explanatory power with a 76.7 per cent prediction rate and satisfied the common statistical support condition.

Following Jo and Stuart (2009), an analytical weight was derived using the estimated propensity score. Among the program group sample, observations of those with high program exposure received a weight of 1. Observations of program group students without high exposure were dropped from the analysis sample. Among the control group sample, each observation received a weight of P / (1-P), where P was the observation's estimated propensity score. The weighted control group sample served as the comparison group in this exposure analysis. The weighted samples helped to balance pre-treatment characteristics differences between the high exposure group and the comparison group. Regression adjustment was further applied to align the remaining sample differences.

Impacts of BC AVID among students with high exposure to AVID activities

Table 15 presents key impacts for those program group students with high exposure to AVID activities. The impacts were estimated by applying the analytical weight derived from propensity score model described in the last section to the control group. Readers should note that the standard errors included were not adjusted for potential peer effects within the same site-cohort and so it is likely that these standard errors are underestimates. This means statistical significance may be attributed to impact estimates more often than is justified.

Outcomes	AVID HE	Comparison	Difference	S.E.
Enrolled in university or college (%)	56.0	46.3	9.8 ***	(3.6)
Enrolled in university (%)	25.2	17.4	7.9 ***	(3.0)
Enrolled in college (%)	47.5	38.7	8.7 **	(3.7)
Graduated from university or college (%)	28.3	21.8	6.5 **	(3.2)
Graduated from university (%)	9.9	5.6	4.2 **	(2.1)
Graduated from college (%)	20.8	17.7	3.1	(2.9)
Continuing studies in any university or college program for two or more years (%)	43.6	35.4	8.2 **	(3.5)
Continuing studies in any university program for two or more years	19.8	14.4	5.4 **	(2.8)
Continuing studies in any college program for two or more years	33.6	27.0	6.6 *	(3.4)
Leaving/dropping out from university or college (%)	29.8	30.3	-0.5	(3.4)
Leaving/dropping out from university (%)	8.9	10.4	-1.5	(2.2)
Leaving/dropping out from college (%)	30.5	25.9	4.6	(3.4)
Switched institutions (%)	20.5	13.8	6.7 **	(2.7)
Sample Size	325	430		

Table 15 BC AVID's impacts on high exposure group – Selected outcomes

Sources: BC Ministry of Advanced Education STP Data, BC AVID Baseline survey, school records data and AVID records. **Notes:** Estimates are weighted with analytical weight derived from propensity score matching model and regression adjusted. Statistical significance levels are indicated as * = 10 per cent; *** = 5 per cent; *** = 1 per cent. Rounding may cause slight discrepancies in sums and differences.

Contrary to the earlier findings from a similar analysis in Appendix 7 of Ford et al. (2014), BC AVID had positive effects on enrolment, graduation, and persistence for both university and college programs among students with high exposure to the program. BC AVID increased enrolments in a university program by 7.9 percentage points without increasing any drop out among the high exposure program group members. As a result, after 6 potential post-secondary years, the percentage of participants graduated from university increased by 4.2 percentage points. BC AVID also increased community college enrolments by 8.7 percentage points, while the increases in graduation or dropping are both positive but not statistically significant. That said, BC AVID increased college continuation for two or more years by 6.6 percentage points, suggesting that BC AVID's small effect on college graduation might be related to the longer period program students enrolled (possibly extending beyond the six-year analysis observation window), or possibly switching into a university level program before graduation among the high exposure program group.

BC AVID also increased the percentage of students in the high exposure group who switched institutions by 6.7 percentage points. This result was inconsistent with the hypothesis that BC AVID students would have had sufficient information and academic skills to make a firm decision about their post-secondary education and handle the academic demand. Instead, possibly they were more willing to try different avenues and eventually find their match of PSE program.⁵

⁵ Notice that the outcome measured is the incidence of switching institutions, not programs. Many BC PSE institutions offer both college and university level programs and as a result, program switching and institution switching are correlated but not perfectly aligned.

Summary of findings

- In general, the impacts of offering BC AVID on university or community college enrolment, persistence, and graduation were too small to be statistically significant over the ten years following the project start.
- There was evidence that the offer of BC AVID improved matching of students to program level based on original (pre-AVID) numeracy skill scores, but it may just have equipped these groups of students better for their later studies. BC AVID had a strong positive impact on college enrolment among students in the lowest quartile of Grade 7 FSA numeracy scores (by 12.3 percentage points) while it had a strong negative impact among those in the highest quartile of numeracy scores (by -11.3 percentage points). It also improved college persistence among students scoring in the lowest quartile of numeracy scores by 18.1 percentage points in two or more years of study continuation. BC AVID also improved university persistence among students who had a higher Grade 7 FSA numeracy score, by increasing two or more years of study continuance by 8.0 percentage points among students in the third quartile of numeracy scores, and it improved university graduation by 5.56 percentage points among students with an above median numeracy scores.
- The offer of BC AVID improved college graduation and reduced dropping out among students with an above median Grade 7 FSA reading comprehension score.
- Among students in the lowest quartile of family income, offering BC AVID yielded a substantial reduction in the proportion who dropped out from university, by 9.2 percentage points.
- There were signs of differential impacts on enrolment and persistence by cohorts, possibly reflecting the effects of different implementations of, or exposures to, the program.
- Among students with high exposure to the BC AVID program (defined as participation in BC AVID program activities in each of the four high school years), BC AVID increased enrolment in a university program by 7.9 percentage points without increasing dropping out, and it increased the proportion graduating university by 4.2 percentage points.
- Among students with high exposure to the BC AVID program, BC AVID increased enrolments in a community college program by 8.7 percentage points and college continuation for two or more years by 6.6 percentage points. There were also increases in college graduation and dropping out but these were not statistically significant.
- In summary, the results of this longer term follow up study suggest that BC AVID had differential impacts in university and college enrolment, persistence, and graduation and in particular that high exposure to the program activities was associated with improved PSE outcomes.

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Appendix A: Graphical presentations of annual impacts



Enrolment in university and college











Impacts on Enrolment in a University or College Program 10 Years After Random Assignment, by FSA Grade 7 Reading Score









Enrolment in university



Relative years since random assignment



Impacts on Enrolment in a University Program 10 Years After Random Assignment, by FSA Grade 7 Reading Score











Relative years since random assignment

Enrolment in college





Impacts on Enrolment in a College Program 10 Years After Random Assignment, by FSA Grade 7 Reading Score









Graduation from university or college







Impacts on Graduation from a University or College Program 10 Years After Random Assignment, by FSA Grade 7 Reading Score





Impacts on Graduation from a University or College Program 10 Years After Random Assignment, by Student Cohorts





Graduation from university













Graduation from college









Impacts on Graduation from a College Program 10 Years After Random Assignment, by FSA Grade 7 Reading Score









Continuing studies in university or college











Impacts on Continuing Study at University or College Programs 10 Years After Random Assignment, by Grade 7 FSA Reading Score











Continuing studies in university




















Continuing studies in college







Impacts on Continuing Study at College Programs 10 Years After Random Assignment, by Grade 7 FSA Reading Score









Leaving/dropping out of university and college











Impacts on Leaving/Dropping Out of University or College Program 10 Years After Random Assignment, by Grade 7 FSA Reading Score





Impacts on Leaving/Dropping Out of University or College Program 10 Years After Random Assignment, by Student Cohorts





Leaving/dropping out of university



Impacts on Leaving/Dropping Out of University Program 10 Years After Random Assignment, by Family Income

















Leaving/dropping out of college

















Impacts on Leaving/Dropping Out of College Program 10 Years After Random Assignment, by Student Cohorts





Switching institutions

















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