ONLINE APPENDIX

The Long-Term Effects of Career Guidance in High School and Student Financial Aid: Evidence from a Randomized Experiment

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A Data Appendix

A.1 Baseline Survey

Baseline socio-demographic characteristics of the students and their parents were collected during the baseline survey in Grade 9 by the SRDC (Statistics Canada and Social Research and Demonstration Corporation 2022). I use this information to conduct balance tests, to control for baseline characteristics in some specifications, and to conduct some heterogeneity analyses.

A.2 High School Records

Students' test scores and courses taken in high school were collected by the SRDC from the provincial education department in New Brunswick (Statistics Canada and Social Research and Demonstration Corporation 2022). From these data, I use the variable "average test score in Grade 9" as a proxy for students' academic preparation. It is the average of all grades obtained by an individual during 9th grade, with one grade received per course/subject, and is expressed from 0 to 100.[1] The variable is not a perfect measure of academic preparation. First, the tests taken are not standardized across schools such that the measure can reflect differences in difficulty and grading practices across schools/teachers. Second, although students in Grade 9 in New Brunswick all take the same core courses (Mathematics, English/French, Sciences, Social studies), there are some variations for other courses (Arts, Second Language, Technology, Physical Education, Personal Development). The variable can thus also reflect some slight differences in courses taken across students.

A.3 Post-secondary Institutions Records

Post-secondary institutions records come from Statistics Canada Post-Secondary Information System (PSIS) (Statistics Canada 2022c). Linkage keys between the PSIS and SRDC experimental data were derived by Statistics Canada using students' Social Insurance Numbers, dates of birth, sex, and names that were collected during the baseline survey (Statistics Canada 2022a).

The PSIS provides student-level information on enrollment and graduation from most publicly-funded post-secondary institutions in Canada. At the time this paper is written, the last available year of data from the Post-Secondary Information System is the 2018–19 academic year, which means that I observe enrollment and graduation until 10 years after high school graduation for both cohorts of students.

The PSIS has two limitations. First, the PSIS does not cover private institutions. Private institutions in Canada are for the vast majority private career colleges, which offer short and career-oriented programs of one year or less (Jones and Li 2015; Usher and Balfour 2023).[2] Enrollment in

1. Each course-level grade is a combination of test results and other assessments given at the class-level, and is expressed from 0 to 100.

2. Other private post-secondary institutions are non-standard universities (mostly religious), language and theo-

these private career colleges is non-negligible: it represents 11 percent of the student body according to Usher and Balfour (2023). I identify enrollment in these private career colleges using the survey conducted two and a half years after high school graduation. The survey is, however, conducted too soon to provide a reliable view of graduation.

Second, although the PSIS aims to cover the universe of publicly-funded post-secondary institutions, a few public institutions are not covered in the years we are interested in (2007-2017).

1. The PSIS records do not cover the New Brunswick community colleges before 2010. To address this important limitation, I supplement the PSIS records until 2010 with data on enrollment and graduation gathered by the SRDC from the New Brunswick Department of Post-secondary Education, Training, and Labour. Combined together, the records cover all four-year public and community colleges in New Brunswick from 2007 – the typical first year of enrollment for the first cohort of students – onward.

2. In the years 2007 and 2008, the PSIS records are only available for a selected set of provinces outside of New Brunswick (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, Alberta, and British Columbia (2008 only)). This implies that I never observe, in the PSIS, individuals who enrolled in the non-covered provinces if they were not enrolled in 2009 or after (i.e., beyond the age of 19 for the first cohort and 18 for the second cohort). The fraction of these students is likely to be small: I estimate, using the 1991 birth cohort for which the issue does not apply, that it concerns less than 1 percent of the students in my sample.[3]

3. About 6 percent of community colleges are missing from the records each year. These colleges are located in Ontario and Saskatchewan in 87 percent of the cases, and thus, should attract only a small share of the students in our sample.

From these data, I construct the following outcomes of interest:

- "Ever enrolled in college" is a binary variable that takes the value of one if a student ever enrolled in a public college in a program leading to a certificate, diploma, or degree, and zero otherwise. Enrollment is measured within 10 years of the theoretical end of high school.

- "First enrolled in a four-year college" is a binary variable that takes the value of one if the student's first enrollment in college is in a four-year college (also called university), and zero otherwise.

- "First enrolled in a community college" is a binary variable that takes the value of one if the student's first enrollment in college is in a community college, and zero otherwise.

logical schools, and offshore institutions. They all attract a small number of students (Jones and Li 2015; Usher and Balfour 2023).

3. About 88 percent of the New Brunswick high school students who enroll in a public post-secondary institution attend one beyond the age of 19, and about 88 percent attend a post-secondary institution in New Brunswick or Nova Scotia, both of which are covered from 2007.

- "Ever completed four-year college" is a binary variable that takes the value of one if the student ever obtained a certificate, diploma, or degree from a four-year college, within 10 years of the theoretical end of high school.

- "Ever completed community college" is a binary variable that takes the value of one if the student ever obtained a certificate, diploma, or degree from a community college, within 10 years of the theoretical end of high school.

- "Dropped out from college" is a binary variable that takes the value of one if a student ever enrolled in a public college and never graduated from a public college as per the definitions above, and zero otherwise. The variable takes the value of zero for students still enrolled in college 10 years after the theoretical end of high school.

- "Years of post-secondary schooling" is the number of years a student was enrolled in a public college within 10 years of the theoretical end of high school.

- "Ever enrolled in a private career college" is a binary variable that takes the value of one if a student ever enrolled in a private career college in a program leading to a certificate, diploma, or degree, and zero otherwise. Enrollment is measured within 3 years of the theoretical end of high school.

A.4 Tax Returns

Tax returns from the universe of tax returns in Canada from 2007 to 2019 were linked to SRDC experimental data (Statistics Canada 2022d). Linkage keys between the tax returns database and SRDC experimental data were derived by Statistics Canada using students' Social Insurance Numbers, dates of birth, sex, and names that were collected during the baseline survey.

If a tax return is not found for an individual in a particular year, which arises if the individual did not fill a return for that year, I impute the value of zero to the income variables.[4] At the time this paper is written, the returns provide information on individual annual income until 29 years old for both cohorts. From these data, I construct the following outcomes of interest:

- "Annual labor income at ages 27–29": is the average annual income that the individual received from paid employments between ages 27 and 29, before any deductions. It excludes self-employment income, tips, and gratuities (i.e., it only includes income reported in T4 slips). It is expressed in 2019 Canadian dollars.

- "Ever employed during the year of 29th birthday": is a binary variable that takes the value of one if the individual received any employment income during the year of her 29th birthday.

4. The tax filing rate is very high in Canada since individuals need to file a tax return, not only when they owe taxes, but also to qualify for a number of refunds and credits. Tax returns were not found for only 5 to 8 percent of individuals each year.

- “Annual income conditional on being employed during the year of 29th birthday” is the annual income that an individual received from paid employments during the year of her 29th birthday. It is only expressed for the subsample of individuals who received any employment income during the year.

- “Works in high-paying industry during the year of 29th birthday” is a binary variable that takes the value of one if the individual main employment during the year of her 29th birthday is in a high-paying industry. Industries are classified using 2-digit NAIC codes. High-paying industries are industries that pay, on average, above the median, according to Statistics Canada Longitudinal Administrative Databank (Statistics Canada 2022b). It is only expressed for the subsample of individuals who received any employment income during the year.

B Details on the Future to Discover Experiment

B.1 Context

The Future to Discover experiment was conducted in the province of New Brunswick, Canada. High school in New Brunswick, like in the U.S., runs from Grades 9 to 12, after which students can decide whether to enroll in post-secondary education or not. Students are typically 14 years old at the beginning of high school and graduate at age 18. Three main options are available to students who want to enroll in post-secondary education in Canada: (1) four-year colleges (also called universities) offering programs that lead to a bachelor's degree; (2) community colleges (also called colleges of applied arts and technology or institutes of technology or science) which typically grant diplomas for technical studies of two years; and (3) private career colleges that offer career-oriented programs of one year or less.

Tuition and fees in New Brunswick for one year of undergraduate schooling at a four-year college were roughly equal to CA$6,600 at the time when most students from the sample enrolled in post-secondary education (2019 Canadian dollars).[5] This is higher than in Western European countries but lower than in the U.S. (OECD 2020). Although tuition and fees are smaller in Canada compared to the U.S., financial aid policies are also less generous. In fact, comparing tuition and fees net of grant aid, real costs of college attendance are lower in the U.S. than in Canada for lower-income students (Belley, Frenette, and Lochner 2014).

In Canada, 33 percent of adults have a four-year college degree, which is comparable to other developed countries (Statistics Canada 2020). However, unlike other countries, Canada is characterized by a very high enrollment rate in community and private career colleges: 26 percent of Canadian adults have a short-cycle tertiary diploma compared to 7 percent of adults in other OECD countries (Statistics Canada 2020).

The population in New Brunswick is slightly less educated than the rest of the Canadian population: 24 percent of adults in New Brunswick have a four-year college degree (Statistics Canada 2020). The lower level of education is also reflected in lower income levels in New Brunswick compared to the rest of Canada.[6]

B.2 Career Guidance Workshops

The workshops were designed in collaboration with Jobmatics, Canadian Career Development Foundation, Educational Policy Institute, Allegro 168 Communications + Design, DMHS Group Inc. They were split into the following four series:

5. Tuition and fees from the four main four-year colleges were retrieved from Statistics Canada: *Table 37-10-0045-01 Canadian and international tuition fees by level of study.*

6. Statistics were retrieved from Statistics Canada: *Table 11-10-0190-01 Market income, government transfers, total income, income tax and after-tax income by economic family type.*

1. *Career Focusing*: The first workshop series was conducted in Grade 10. It included six workshops that were designed to guide students in the exploration of career options. Besides being taught how to research information on post-secondary education and labor market trends, students were encouraged to explore their post-secondary options through different activities and exercises.

2. *Lasting Gifts*: The second workshop series, which took place in Grade 11, was tailored toward the parents. The four workshops of the series aimed to encourage and assist parents in getting involved in their children's career guidance. Together with their children, parents were exposed to various career guidance approaches and were instructed to test these approaches through interactive activities and reflective exercises.

3. *Future in Focus*: The third workshop series was designed to help Grade 12 students build resilience to overcome unexpected life challenges. The workshops focused on the specific skills and attitudes needed to work through obstacles and on the importance of developing a support network.

4. *Post-secondary Ambassadors*: Six meetings with post-secondary education students from various institutions were organized over Grades 10 to 12. The invited students were asked to share their experiences and advice, providing high school students with peer mentors and role models.

Social Research and Demonstration Corporation (2009) provides additional information on the content and delivery of the workshops.

B.3 Workshops Attendance

Figure B.1 reports the distribution of the number of workshops attended per student. On average, students attended 8 workshops out of 20, 15 percent of students never attended a workshop, and 22 percent attended most of the workshops (i.e., more than 75 percent of the workshops). Attendance declined over time: while the attendance rate at each workshop was roughly equal to 60 percent during the first year (Grade 10), it dropped to 30 percent in Grades 11 and 12. Parents were also invited to some of the workshops: 71 percent of the parents attended the orientation session and 46 percent attended at least one *Lasting Gifts* session. The numbers are derived from Social Research and Demonstration Corporation (2009), which also provides additional details.

B.4 Experimental Design

Figure B.2 provides an overview of the experimental design as well as the number of students at each step of the randomization process.

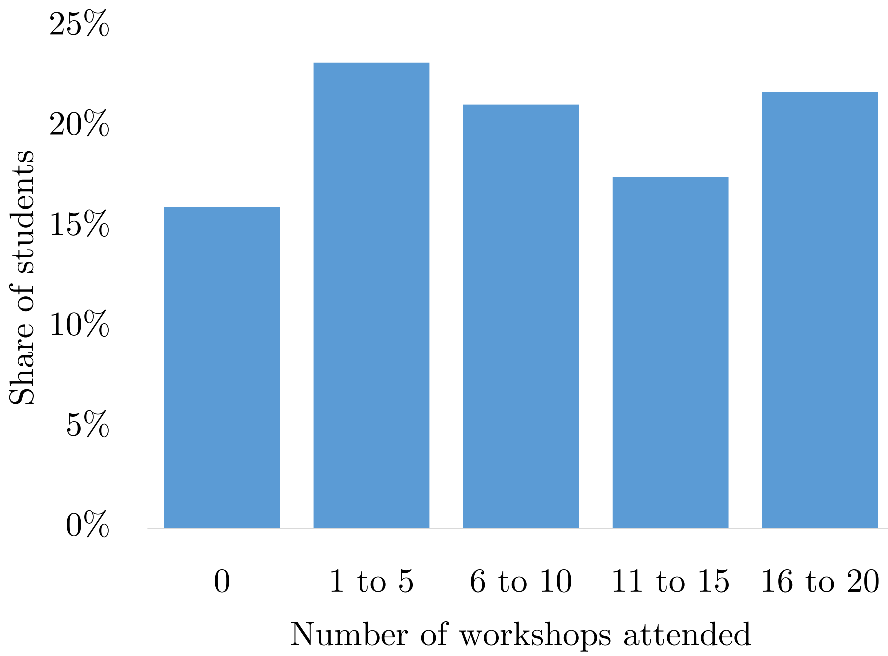

Figure B.1: Workshops Attendance

Notes: The figure reports the distribution of the number of workshops attended by each student, out of 20 workshops. The numbers are derived from Social Research and Demonstration Corporation (2009). The sample size is 1,750 students.

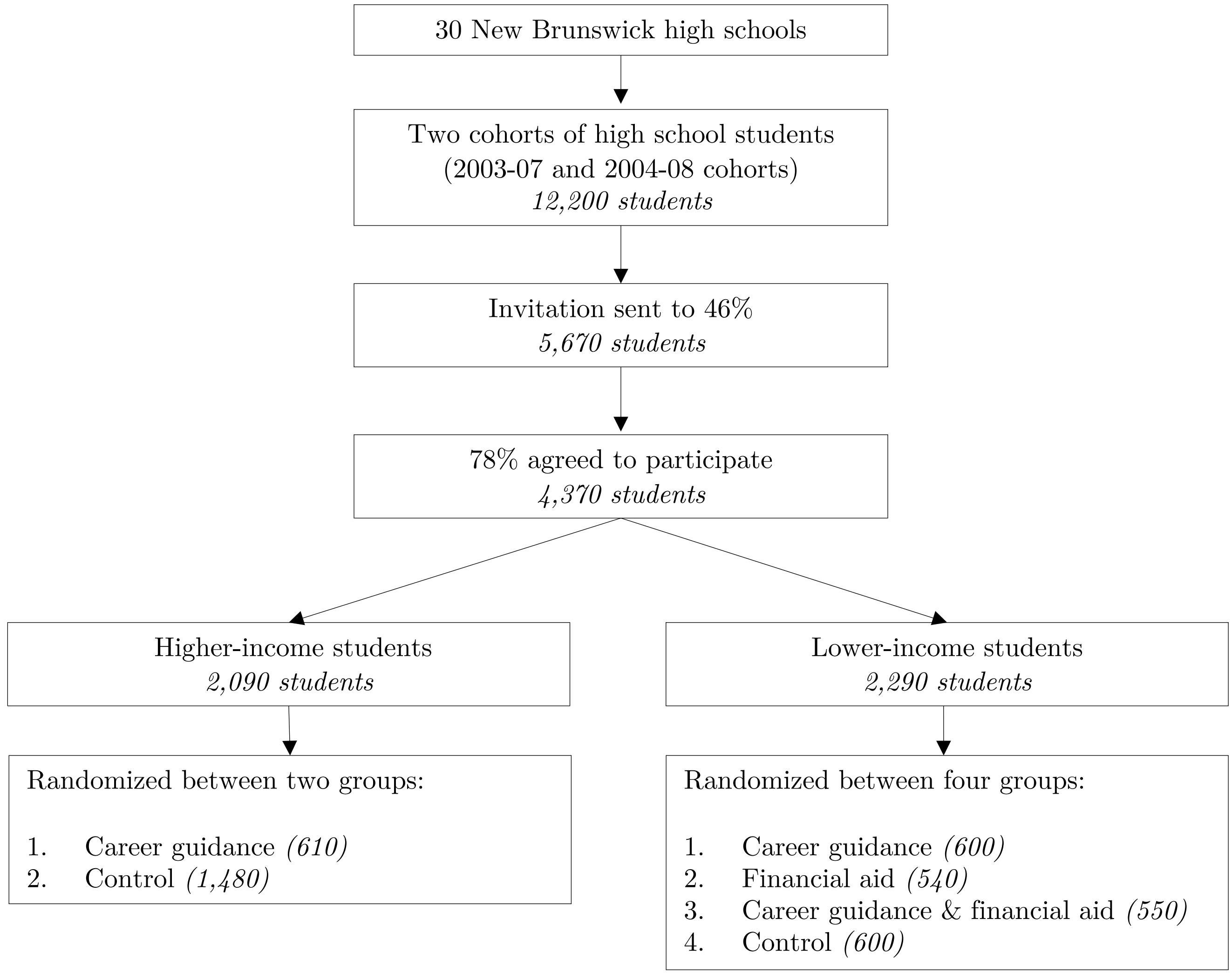

Figure B.2: Experimental Design

Notes: The figure provides an overview of the experimental design with the number of students at each step of the randomization process. The numbers are derived from both Social Research and Demonstration Corporation 2007 and the author's calculations.

C Decomposition of the Gap in Four-Year College Enrollment by Parental Income

I decompose the gap in four-year college enrollment between high-and low-income students into a part that can be explained by students academic preparation as measured by students average test scores in Grade 9 and high school fixed effects, and a part that cannot.

Students are defined as high- and low-income students following the initial classification of students made by the SRDC for randomization purposes. The classification was done according to the family income, which was collected during the interview, and an income threshold equal to the provincial median. Appendix Table C.2 presents the decomposition of the gap between students from very high-income and very low-income families.[7]

I follow a traditional Kitagawa-Oaxaca-Blinder decomposition (Kitagawa 1955, Blinder 1973, Oaxaca 1973).[8] Specifically, consider the following linear probability model:

$$Y_{gi} = \mathbf{X}'_{gi}\beta_g + \epsilon_{gi}, \tag{1}$$

where Y_{gi} is a binary variable equals to one if student i enrolled in a four-year college, and zero otherwise. g can take the value h if student i come from a high-income family and l if student i come from a low-income family. $\mathbf{X}$ is a vector of variables capturing academic preparation, namely students average test scores in Grade 9 and high school fixed effects, and a constant. ϵ_{gi} is the error term, with $E[\epsilon_{gi}] = 0$. I include high school fixed effects in order to account for differences in test difficulty, grading practices, and courses offered across schools. The test score measure is missing for 22 students (less than 2 percent of the sample). I assign the mean value to these students and add an indicator of missingness into the decomposition to account for these missing values while keeping the full sample of students.

The gap in four-year college enrollment between high- and low-income students is given by:

$$E(Y_h) - E(Y_l) = E[\mathbf{X}_h]'\beta_h - E[\mathbf{X}_l]'\beta_l, \tag{2}$$

which can be rewritten as follows:

$$E(Y_h) - E(Y_l) = (E[\mathbf{X}_h] - E[\mathbf{X}_l])'\beta^* + E[\mathbf{X}_h]'(\beta_h - \beta^*) + E[\mathbf{X}_l]'(\beta^* - \beta_h), \tag{3}$$

where β^* are some reference coefficients chosen by the econometrician. In equation 4, $(E[\mathbf{X}_h] - E[\mathbf{X}_l])'\beta^*$ is the explained part of the gap, and $E[\mathbf{X}_h]'(\beta_h - \beta^*) + E[\mathbf{X}_l]'(\beta^* - \beta_h)$ is the unexplained

7. Very high-income students are students whose parents' annual income is 80k or more at the time of the baseline survey (top income category). Very low-income students are students whose parents' annual income is less than 20k at the time of the baseline survey (bottom income category).

8. In practice, the results were produced using the Stata package `oaxaca`, which follows the methodology described below (Jann 2008).

part of the gap.

In the main text, I report the decomposition using, as the reference coefficients β^*, the coefficients obtained from estimating equation 1 on the pooled sample of students.[9] Appendix Table C.1 presents the decomposition using, as the reference coefficients β^*, the low-income and high-income students' coefficients.

9. The regression includes as an additional regressor an indicator variable for parental income group.

Table C.1: Alternative Methods to Decompose the Gap in Four-year College Enrollment between High- and Low-income Students

	Control group	Guidance group	Treatment effect	% change
Panel A: Using low-income coefficients as the reference coefficients				
Explained by average test scores and high school FE	0.125	0.110	-0.015	-12%
	(0.016)	(0.018)	(0.024)	
Unexplained by average test scores and high school FE	0.180	0.074	-0.106	-59%
	(0.025)	(0.027)	(0.037)	
Panel B: Using high-income coefficients as the reference coefficients				
Explained by average test scores and high school FE	0.188	0.165	-0.023	-12%
	(0.019)	(0.023)	(0.030)	
Unexplained by average test scores and high school FE	0.117	0.020	-0.097	-83%
	(0.022)	(0.026)	(0.034)	

Notes: The table reports the gap in four-year college enrollment between high- and low-income students in both the control and career guidance groups. Each gap is decomposed into a part that can be explained by students' academic preparation as measured by students' average test scores in Grade 9 and high school fixed effects, and a part that cannot. The decomposition is performed using a traditional Kitagawa-Oaxaca-Blinder decomposition using, as the reference coefficients, the coefficients from the low-income sample in Panel A, and from the high-income sample in Panel B.

Table C.2: Gap in Four-year College Enrollment between Very High- and Very Low-income Students

	Control group	Guidance group	Treatment effect	% change
Gap between very high- and very low-income students	0.515	0.352	-0.163	-32%
	(0.032)	(0.044)	(0.055)	
Explained by average test scores and high school FE	0.274	0.270	-0.004	-1%
	(0.032)	(0.038)	(0.050)	
Unexplained by average test scores and high school FE	0.241	0.082	-0.159	-66%
	(0.039)	(0.044)	(0.059)	

Notes: The table reports the gap in four-year college enrollment between very high- and very low-income students in both the control and career guidance groups. Very high-income students are students whose parents' annual income is 80k or more at the time of the baseline survey (top income category). Very low-income students are students whose parents' annual income is less than 20k at the time of the baseline survey (bottom income category). Each gap is decomposed into a part that can be explained by students' academic preparation as measured by students' average test scores in Grade 9 and high school fixed effects, and a part that cannot. The decomposition is performed using a traditional Kitagawa-Oaxaca-Blinder decomposition using, as the reference coefficients, the coefficients, the coefficients from a pooled regression.

D Robustness Checks

Table D.3: Treatment Effects, Specification with Controls for Baseline Characteristics

		First enrollment		College completion				
	Ever enrolled	Four-year college	Community college	Four-year college	Community college	Dropped out	Years of PSE	Annual labor income
Panel A: TE on low-income students								
Guidance intervention	0.046	0.062	-0.016	0.020	-0.013	0.035	0.259	1,655
	(0.026)	(0.022)	(0.026)	(0.019)	(0.024)	(0.021)	(0.116)	(1,491)
Financial aid intervention	0.082	0.020	0.062	-0.013	0.074	0.009	0.085	-1,012
	(0.026)	(0.021)	(0.027)	(0.019)	(0.026)	(0.020)	(0.111)	(1,372))
Mixed intervention	0.067	0.075	-0.007	0.020	0.030	0.007	0.249	1,023
	(0.026)	(0.021)	(0.026)	(0.018)	(0.026)	(0.020)	(0.114)	(1,434)
Panel B: TE on high-income students								
Guidance intervention	-0.035	-0.027	-0.008	0.007	-0.006	-0.027	-0.050	2,116
	(0.019)	(0.019)	(0.019)	(0.019)	(0.021)	(0.016)	(0.108)	(1,378)
Sample size	4,370	4,370	4,370	4,370	4,370	4,370	4,370	4,370
P-values equality tests of TE								
TE on low-income students								
Guidance = aid	0.168	0.063	0.003	0.102	0.001	0.233	0.130	0.086
Mixed = guidance + aid	0.096	0.807	0.152	0.634	0.391	0.196	0.555	0.856
Mixed = guidance	0.417	0.586	0.734	0.991	0.094	0.179	0.929	0.693
Mixed = aid	0.573	0.013	0.010	0.080	0.104	0.900	0.146	0.170
TE of guidance								
Low-income = high-income	0.010	0.002	0.807	0.612	0.828	0.016	0.052	0.821

Notes: The table reports the effects of three interventions on the main outcomes of interest. Each column represents a OLS regression of the dependent variable on treatment dummies, a parental income dummy, and strata dummies (equation 1). Unlike the specification used in Tables 2 and 3, the specification includes controls for the baseline characteristics listed in Table 1. Huber-White robust standard errors are reported in parentheses. Sample sizes are rounded to the nearest 10 for data confidentiality concerns.

Table D.4: Treatment Effects, Specification without Weights

	Ever enrolled	First enrollment: Four-year college	First enrollment: Community college	College completion: Four-year college	College completion: Community college	College completion: Dropped out	Years of PSE	Annual labor income
Panel A: TE on low-income students								
Guidance intervention	0.064	0.091	-0.027	0.046	-0.013	0.027	0.417	2,157
	(0.028)	(0.025)	(0.026)	(0.022)	(0.025)	(0.020)	(0.137)	(1,549)
Financial aid intervention	0.100	0.042	0.058	0.007	0.079	0.004	0.229	-335
	(0.029)	(0.025)	(0.027)	(0.021)	(0.026)	(0.020)	(0.129)	(1,451)
Mixed intervention	0.071	0.081	-0.010	0.028	0.028	0.005	0.285	1,579
	(0.029)	(0.025)	(0.026)	(0.021)	(0.025)	(0.020)	(0.135)	(1,526)
Panel B: TE on high-income students								
Guidance	-0.031	-0.020	-0.011	0.012	-0.004	-0.029	-0.014	2,040
	(0.021)	(0.024)	(0.021)	(0.023)	(0.021)	(0.016)	(0.132)	(1,483)
Sample size	4,370	4,370	4,370	4,370	4,370	4,370	4,370	4,370
P-values equality tests of TE								
TE on low-income students								
Guidance = aid	0.214	0.064	0.002	0.081	0.000	0.270	0.163	0.121
Mixed = guidance + aid	0.023	0.155	0.275	0.413	0.293	0.361	0.060	0.912
Mixed = guidance	0.817	0.704	0.516	0.435	0.113	0.283	0.349	0.728
Mixed = aid	0.322	0.141	0.013	0.335	0.059	0.957	0.677	0.224
TE of guidance								
Low-income = high-income	0.007	0.001	0.624	0.276	0.801	0.028	0.024	0.953

Notes: The table reports the effects of three interventions on the main outcomes of interest. Each column represents a OLS regression of the dependent variable on treatment dummies, a parental income dummy, and strata dummies (equation 1). Unlike the specification used in Tables 2 and 3, the specification does not include weights. Huber-White robust standard errors are reported in parentheses. Sample sizes are rounded to the nearest 10 for data confidentiality concerns.

Table D.5: Treatment Effects, Specification Restricted to Follow-up Students

		First enrollment		College completion				
	Ever enrolled	Four-year college	Community college	Four-year college	Community college	Dropped out	Years of PSE	Annual labor income
Panel A: TE on low-income students								
Guidance intervention	0.084	0.110	-0.026	0.067	-0.028	0.052	0.544	3,961
	(0.031)	(0.028)	(0.028)	(0.024)	(0.027)	(0.023)	(0.151)	(1,778)
Financial aid intervention	0.104	0.046	0.058	0.007	0.076	0.011	0.220	-400
	(0.029)	(0.025)	(0.028)	(0.021)	(0.026)	(0.020)	(0.132)	(1,458)
Mixed intervention	0.071	0.080	-0.009	0.025	0.030	0.006	0.278	1,534
	(0.029)	(0.025)	(0.026)	(0.021)	(0.026)	(0.020)	(0.138)	(1,522)
Panel B: TE on high-income students								
Guidance intervention	-0.031	-0.015	-0.016	-0.002	0.001	-0.019	-0.038	2,775
	(0.023)	(0.026)	(0.023)	(0.025)	(0.023)	(0.017)	(0.145)	(1,581)
Sample size	4,370	4,370	4,370	4,370	4,370	4,370	4,370	4,370
P-values equality tests of TE								
TE on low-income students								
Guidance = aid	0.515	0.030	0.004	0.014	0.000	0.082	0.030	0.017
Mixed = guidance + aid	0.006	0.052	0.301	0.134	0.638	0.069	0.017	0.394
Mixed = guidance	0.684	0.314	0.543	0.093	0.035	0.050	0.084	0.197
Mixed = aid	0.257	0.211	0.017	0.405	0.095	0.811	0.668	0.220
TE of guidance								
Low-income = high-income	0.003	0.001	0.766	0.048	0.408	0.013	0.005	0.618

Notes: The table reports the effects of three interventions on the main outcomes of interest. Each column represents a OLS regression of the dependent variable on treatment dummies, a parental income dummy, and strata dummies (equation 1). Unlike the sample used in Tables 2 and 3, the sample is restricted to the students who were randomly selected to answer the surveys. Huber-White robust standard errors are reported in parentheses. Sample sizes are rounded to the nearest 10 for data confidentiality concerns.

E Additional Results

Table E.6: Treatment Effects on Survey Outcomes

	Aspires to pursue a four-year college degree (Follow-up survey 1)	Ever enrolled in a private career college (Follow-up survey 2)
Panel A: TE on low-income students		
Guidance intervention	0.119	-0.009
	(0.033)	(0.023)
Financial aid intervention	0.053	-0.005
	(0.031)	(0.021)
Mixed intervention	0.091	0.018
	(0.031)	(0.022)
Panel B: TE on high-income students		
Guidance intervention	-0.032	0.013
	(0.028)	(0.016)
Sample size	3,220	3,150
% asked to answer the survey	82%	82%
Response rate	88%	90%
Differential response rate treatment vs. control groups		
(a) Low-income students		
Guidance intervention	0.000 [0.99]	-0.007 [0.75]
Financial aid intervention	0.059 [0.00]	0.036 [0.06]
Mixed intervention	0.028 [0.15]	0.019 [0.32]
(b) High-income students		
Guidance intervention	-0.056 [0.00]	-0.026 [0.05]

Notes: The table reports the effects of three interventions on selected outcomes derived from the follow-up surveys conducted by the SRDC. Each column represents a OLS regression of the dependent variable on treatment dummies, a parental income dummy, and strata dummies (equation 1). Each regression is adjusted with inverse probability weights to be comparable with the full sample of students. These weights are constructed from a probit regression of an indicator of missingness on treatment dummies, baseline characteristics, cohort, and school dummies. Huber-White robust standard errors are reported in parentheses. Sample sizes are rounded to the nearest 10 for data confidentiality concerns. At the bottom of the table, I report the differences in response rates by treatment status, along with the p-values for the tests of equal response rates in square brackets.

Table E.7: Heterogeneity of Treatment Effects on College Enrollment (Low-income Students Only)

	Enrolled in a four-year college			Enrolled in a community college		
	TE guidance	TE aid	TE mixed	TE guidance	TE aid	TE mixed
Panel A: by gender						
Male	0.103	0.016	0.097	-0.026	0.116	0.023
	(0.033)	(0.030)	(0.032)	(0.038)	(0.041)	(0.038)
Female	0.092	0.068	0.074	-0.028	0.010	-0.041
	(0.037)	(0.038)	(0.038)	(0.036)	(0.037)	(0.037)
P-value equality test	0.837	0.285	0.646	0.977	0.058	0.228
Panel B: by language spoken at home						
French speaker	0.099	0.076	0.087	-0.017	0.052	-0.013
	(0.038)	(0.039)	(0.038)	(0.041)	(0.043)	(0.042)
English speaker	0.095	0.019	0.073	-0.035	0.063	-0.006
	(0.035)	(0.033)	(0.034)	(0.033)	(0.035)	(0.033)
P-value equality test	0.947	0.262	0.795	0.732	0.838	0.886
Panel C: by parental education						
No parent with	0.062	0.053	0.075	0.013	0.064	0.017
higher education	(0.030)	(0.031)	(0.031)	(0.035)	(0.038)	(0.036)
At least one with	0.125	0.026	0.076	-0.073	0.045	-0.040
higher education	(0.041)	(0.039)	(0.041)	(0.038)	(0.040)	(0.039)
P-value equality test	0.217	0.599	0.990	0.098	0.737	0.290
Panel D: by average test score in Grade 9						
Below school median	0.034	0.018	0.029	-0.026	0.078	0.010
	(0.021)	(0.020)	(0.020)	(0.034)	(0.036)	(0.034)
Above school median	0.105	0.051	0.162	-0.021	0.032	-0.041
	(0.046)	(0.048)	(0.048)	(0.040)	(0.043)	(0.042)
P-value equality test	0.162	0.524	0.011	0.928	0.416	0.345
Panel E: by aspiration for higher education in Grade 9						
Does not want a four-	0.053	0.015	0.018	0.021	0.120	0.046
year college degree	(0.027)	(0.025)	(0.025)	(0.040)	(0.043)	(0.042)
Wants a four-year	0.136	0.074	0.113	-0.064	0.010	-0.047
college degree	(0.037)	(0.037)	(0.037)	(0.034)	(0.036)	(0.034)
P-value equality test	0.073	0.187	0.033	0.109	0.051	0.088

Notes: The table reports the effects of three interventions on college enrollment for several subgroups. Each outcome × panel represents a OLS regression of the dependent variable on treatment dummies, treatment dummies interacted with a group dummy, and parental income and strata dummies. Huber-White robust standard errors are reported in parentheses. Reported p-values are for the equality tests of treatment effects across the two subgroups. Only treatment effects on low-income students are reported.

Table E.8: Treatment Effects on Additional Labor Market Outcomes

	During year of 29th birthday		
	Ever employed	Annual income cond. on being employed	Works in a high-paying industry
Panel A: TE on low-income students			
Guidance intervention	-0.004	2,617	0.056
	(0.024)	(1,863)	(0.033)
Financial aid intervention	-0.019	-491	-0.002
	(0.025)	(1,793)	(0.033)
Mixed intervention	-0.028	3,408	0.055
	(0.025)	(1,865)	(0.034)
Panel B: TE on high-income students			
Guidance intervention	0.004	2,719	0.003
	(0.017)	(1,699)	(0.026)
Sample size	4,370	3,540	3,530
Control mean low-income	0.78	37,600	0.46
Control mean high-income	0.85	49,400	0.57
P-values equality tests of TE			
TE on low-income students			
Guidance = aid	0.543	0.118	0.090
Mixed = guidance + aid	0.897	0.633	0.994
Mixed = guidance	0.344	0.696	0.974
Mixed = aid	0.740	0.047	0.102
TE of guidance			
Low-income = high-income	0.791	0.968	0.155

Notes: The table reports the effects of three interventions on selected labor market outcomes measured during the year of the individual 29th birthday. Annual income corresponds to income from all paid employments received during the year. Ever employed equals one if the individual received some employment income during the year. Industries are classified using 2-digit NAIC codes. High-paying industries are industries that pay, on average, above the median. Each column represents a OLS regression of the dependent variable on treatment dummies, a parental income dummy, and strata dummies (equation 1). Huber-White robust standard errors are reported in parentheses. Sample sizes are rounded to the nearest 10 for data confidentiality concerns.

F Comparison with SRDC's Results

The treatment effects on college enrollment and completion for the low-income students were previously reported in a number of SRDC's reports (e.g., Ford et al. 2012; Hui and Ford 2018; Ford, Hui, and Kwakye 2019). For comparison, I present in Table F.9 the estimates reported in Tables 2 and 4 of the paper together with SRDC's most recent estimates (as in Hui and Ford 2018). Note that the effects of the interventions on income in adulthood and on high-income students were not reported in the SRDC's reports and are thus not presented in Table F.9.

The results presented in this paper are generally consistent with the effects previously presented in Hui and Ford (2018), although some differences in the point estimates have to be noted. In particular, I find larger – but not statistically different – effects of the three interventions on four-year college enrollment and completion than previously reported.

The differences between the estimates I report and the estimates that were previously reported can be explained in a few ways. First of all, I use the Post-Secondary Information System, which allows, unlike the data collected by the SRDC, to capture enrollment and graduation from institutions outside the Maritimes Provinces. This is especially important for enrollment and graduation in four-year colleges, as 19 percent of students who enroll in four-year colleges enroll at some point outside the Maritime Provinces.[10] Third, I report the effects on first enrollment, while Hui and Ford (2018) report the effects on enrollment at any time within 7 years of high school graduation. By focusing on first enrollment, I can distinguish the impact on initial enrollment choices from the impact on post-secondary school trajectories. Last, some of the differences in the estimates appear to stem from the specifications used to calculate the effects. Hui and Ford (2018) estimate the treatment effects adjusting for baseline characteristics and restricting the sample to students who were randomly chosen to answer the follow-up surveys. However, they do not clearly specify how the baseline characteristics are chosen and adjusted for and do not justify the sample restriction. In contrast, I choose not to control for baseline characteristics to avoid concerns over specification searching and use the full sample of students. I also show in Tables D.3, D.4, and D.5 how the estimated treatment effects vary across alternative specifications for transparency.

To understand how much of the difference between my estimates and the ones presented in Hui and Ford (2018) is explained by how the outcomes are constructed versus the specification used, I estimate the treatment effects estimated from equation (1) following similar definitions of the outcomes as in Hui and Ford (2018). The effects are reported in Column (2) of Table F.9. This exercise suggests that one-third of the observed difference between the estimates I report and the ones reported in Hui and Ford (2018) is explained by differences in the construction of the outcomes, and two-thirds of the observed difference is explained by differences in the specification used to estimate the effects.

10. The Post-Secondary Information System also allows me to measure enrollment and completion using a longer time window than previously possible – within 10 years of high school graduation versus within 7 years – which can also lead to small differences.

Table F.9: Comparison with estimates in Hui and Ford (2018)

	Estimates reported in Tables 2 and 4 (1)	Estimates using the same definitions as in Hui and Ford (2018) (2)	Estimates reported in Hui and Ford (2018) (3)
Panel A: Enrollment in four-year college			
Guidance intervention	0.097	0.100	0.057
	(0.026)	(0.026)	(0.027)
Financial aid intervention	0.046	0.032	-0.004
	(0.025)	(0.025)	(0.025)
Mixed intervention	0.080	0.073	0.056
	(0.025)	(0.025)	(0.024)
Panel B: Enrollment in community college			
Guidance intervention	-0.027	-0.002	-0.015
	(0.026)	(0.026)	(0.028)
Financial aid intervention	0.058	0.083	0.074
	(0.027)	(0.027)	(0.025)
Mixed intervention	-0.009	0.021	0.018
	(0.026)	(0.026)	(0.027)
Panel C: Completed four-year college			
Guidance intervention	0.048	0.027	0.012
	(0.022)	(0.020)	(0.021)
Financial aid intervention	0.007	0.002	-0.016
	(0.021)	(0.019)	(0.018)
Mixed intervention	0.025	0.013	-0.003
	(0.021)	(0.019)	(0.018)
Panel D: Completed community college			
Guidance intervention	-0.016	-0.008	-0.012
	(0.025)	(0.023)	(0.022)
Financial aid intervention	0.076	0.089	0.082
	(0.026)	(0.025)	0.023)
Mixed intervention	0.030	0.036	0.042
	(0.026)	(0.024)	0.022)
Average distance			
Col. (1) and (3)		0.023	
Col. (2) and (3)		0.016	

Notes: The table reports in Column (1) the treatment effects reported in this paper (as in Tables 2 and 4), and in Column (3) the treatment effects reported by the SRDC (as in Hui and Ford (2018)). Column (2) also reports the treatment effects estimated from equation (1) following similar definitions of the outcomes as in Hui and Ford (2018). Standard errors are reported in parentheses.

G Details on Cost-Benefit Calculation

G.1 Tuition and Fees and Financial Assistance

I estimate the total amount of tuition and fees paid by each individual in the sample by imputing a value of 6,570 for each year of four-year college and 3,100 for each year of community college. These values are a rough estimation of tuition and fees paid by the individuals based on Statistics Canada *Table 37-10-0045-01 Canadian and international tuition fees by level of study* as well as on the tuition and fees indicated on the main institutions' websites (expressed in 2019 Canadian dollars). I estimate the total amount of student grants received from the government using data on financial assistance collected by the SRDC from New Brunswick institutions. I discount all flows back to the end of high school using a 3 percent discount rate.

G.2 Lifetime Income

To estimate each individual's lifetime income, I proceed in three steps. First, I use the 2021 Canadian Census (Statistics Canada 2023) to estimate the typical income growth rate in Canada over time. Specifically, I follow the same methodology as in Angrist, Autor, and Pallais (2022) and estimate the following Poisson regression model on a representative sample of individuals aged 25 to 65 from the Census:

$$\log E(Y_{it}) = \alpha + \beta f(exp_{it}) + \gamma S_i$$

where Y_{itg} is the individual i annual income expressed in 2019 Canadian dollars at age t, $f(exp_{it})$ is a polynomial of degree 4 of the individual imputed years of experience at age t, and S_i is a vector of dummies for the highest level of education obtained by the individual (bachelor degree or short-cycle diploma). The advantage of the Poisson regression model over traditional log models is that it allows the income variable to include zeroes. I impute years of experience with $t - 25$ for individuals with a bachelor's degree, $t - 22$ for individuals with a short-cycle diploma, and $t - 19$ for individuals with no higher education credential. I estimate the model by gender to take into account different income trajectories over time for women and men.

Second, going back to the experimental data, I project each individual's income observed at age 29 using the β coefficients and imputed years of experience, from age 30 to age 65. Specifically, individual i forecasted income at age t is:

$$\hat{Y}_{it} = Y_{i,29} \times \exp\left[\beta(f(exp_{it}) - f(exp_{i,29}))\right]$$

Finally, I compute the lifetime income of each individual by taking the discounted sum of actual and forecasted income flows from 18 to 65 years old, as follows:

$$LI = \sum_{t=18}^{29} \frac{Y_{it}}{(1+r)^{(t-18)}} + \sum_{t=30}^{65} \frac{\hat{Y}_{it}}{(1+r)^{(t-18)}}$$

with r the discount rate equal to 3 percent as for the rest of the cost-benefit calculation.

G.3 Treatment Effects

I estimate the effects of the interventions on the monetary outcomes described above using equation 1. Results are presented in Table G.10.

Table G.10: Treatment Effects on Lifetime Monetary Outcomes

	Net present value of lifetime flows			
	Tuition and fees	Student grant from gvt.	Income before-tax	Income after-tax
Guidance intervention	2,452	356	56,461	40,031
	(784)	(220)	(41,889)	(30,767)
Guidance intervention	-2,470	-319	-1,103	242
× High-income	(1,111)	(258)	(60,730)	(43,668)
Financial aid intervention	932	-261	-97	953
	(749)	(207)	(40,979)	(30,253)
Mixed intervention	1,618	-36	43,524	29,188
	(781)	(208)	(44,489)	(32,852)
Sample size	4,370	4,370	4,370	4,370

Notes: The table reports the effects of three interventions on the net present value of lifetime monetary outcomes. Values are discounted back to the end of high school using a 3 percent discount rate and are expressed in 2019 Canadian dollars. Each column represents a OLS regression of the dependent variable on treatment dummies, a parental income dummy, and strata dummies (equation 1). Huber-White robust standard errors are reported in parentheses. Sample sizes are rounded to the nearest 10 for data confidentiality concerns.

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