The role of career education on students' education choices and post-secondary outcomes

Results Presentation

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For information on SRDC publications, contact

Social Research and Demonstration Corporation
55 Murray Street, Suite 400
Ottawa, Ontario K1N 5M3
613-237-4311 | 1-866-896-7732
info@srdc.org | www.srdc.org

Vancouver Office
789 West Pender Street, Suite 440
Vancouver, British Columbia V6C 1H2
604-601-4070

Calgary Contact
587-890-8425

Montreal Office
4126 Saint-Denis Street, Suite 302
Montreal, Quebec H2W 2M5
514-948-5317 ext. 234

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ACKNOWLEDGEMENT

This research project is funded by CERIC on "*The role of career education on students' education choices and post-secondary outcomes*" which aims to clarify understanding of when, where, and how youth initiate and craft their career aspirations. The literature review representing the initial stage of the project drew heavily from a previously unpublished report funded by Employment and Social Development Canada, under an agreement with SRDC in 2015 (100003644) entitled "How youth develop career decisions?" The support of CERIC has allowed SRDC to update its earlier literature review work for ESDC to inform the new empirical analysis it is undertaking. We are grateful to ESDC for its earlier support and agreeing to the dissemination of the current updated work via CERIC. We are grateful to Riz Ibrahim and other members of CERIC's research committee for advice provided at various stages of the project. The opinions expressed in this publication are those of the authors. They do not purport to reflect the opinions or views of CERIC or its research committee members.

POSITION STATEMENT

The following research project has been completed by researchers based at the independent non-profit research organization Social Research and Demonstration Corporation (SRDC). SRDC was established in 1991 specifically to develop, field test, and rigorously evaluate new programs. SRDC's two-part mission is to help policy-makers and practitioners identify policies and programs that improve the well-being of all Canadians, with a special concern for the effects on the disadvantaged, and to raise the standards of evidence that are used in assessing these policies. Work that adheres to the mission is undertaken by SRDC researchers in accordance with its code of practice. SRDC has conducted over 350 projects and studies for various federal and provincial departments, municipalities, as well as other public and non-profit organizations.

The four-member team includes life-long researchers trained in economics, human geography, education (with specialization in teaching, learning and evaluation), communications and psychology. Two team members are Credentialed Evaluators as recognized by the Canadian Evaluation Society. Team members originate from four continents meaning three are immigrants, all living in Canada's colonial system, living and working on the traditional unceded territory of the Algonquin Anishnaabeg people and the Coast Salish people, including the territories of the Musqueam, Squamish, and Tsleil-Waututh Nations. All team members emphasize that other worldviews, cultures, and social locations besides our own are equally valid, and that each acknowledges a responsibility to understand how our own location impacts our practice. Given the unique nature of SRDC's work, our research activities are also informed by extensive informal discussion with policy makers, practitioners, educators and youth that occur as part of the process of setting up field tests of educational programs in multiple Canadian provinces. The team members have no vested interests in any of the interventions reviewed, analyzed, and reported on.

Reuben Ford

Taylor Shek-wai Hui

Audrey Appiah

Dominique Leonard

EXECUTIVE SUMMARY

This project focuses on policy and practice intended to influence youths' career decisions. It has compiled knowledge from the existing literature and generated new evidence from unique Canadian data to support decisions of policy makers and practitioners on (a) how and when to intervene to assist youth in their career decision making, and (b) for whom supports are effective yet currently lacking. The intent of this venture in secondary analysis overall is to help equip the career counselling profession to respond authoritatively to increasingly urgent policy questions about how optimally to structure career education for young people.

SRDC is using two rich longitudinal data sources created to test experimental career interventions through the linkage of education records to surveys of youth and parents in three provinces. The data document the lives of 7,000 young Canadians, including their occupational aspirations as high school students at age 14, their post-secondary education and employment outcomes over 10 years. Positive and negative impacts of interventions and tracking of outcomes following specific mediators of advice (such as parents, teachers, counsellors, peers) help point to future best practices and the development of tools to support the work of counsellors and guide students in their planning and decision making regarding career choices early in, and throughout, high school.

This is the final technical report of three prepared for the project. For simplicity, we summarize all three reports here, at the expense of producing an unusually long executive summary. SRDC began by reviewing the literature on youth's career decision making and career education to inform the later empirical exploration of the long-term effects of career education interventions. The design of the analysis was included in the second report and is outlined again in the present report alongside the results, conclusions, recommendations, and next steps.

LEARNINGS FROM THE LITERATURE

SRDC's review of the literature was fairly extensive and has been published separately (SRDC, 2020). In general, researchers have developed understanding of how youth make career decisions, but the literature is still in its infancy. There is limited evidence on the effects of youth career education on the long-term evolution of their career decisions. Also missing from the evidence is how career education helps especially vulnerable youth facing multiple barriers in their transition to the labour market. The high-level implications of the review for this project include the following:

- Social cognitive career theory is an important paradigm from which to consider career development because it sheds light on the importance of environmental and contextual

factors. These factors were taken into account in the project's research framework for the empirical analysis. For example, parents, career counsellors, teachers and peers are all groups that can influence career decision-making among youth.

- Because of behavioural biases and heuristics among youth, career decisions are not always rational even if relevant and valuable career education and information are available. The empirical analysis has to consider the effects of these biases and heuristics in interpreting the results.

- Age and stages of career development are important as they determine brain maturity and the structure of educational institutions and other environmental factors influencing youth, which affects their decision making.

- Institutional and social factors are key in the decision-making process. While young people can be encouraged to make career decisions early, as a rule, such decisions are rarely required by specific ages. Nonetheless, the education system more broadly does carry some implicit and explicit expectations for when decisions should be final. Most secondary school systems require students to select courses that may have a bearing on their career direction. Institutional and social factors are not evenly distributed and certain groups of youth can as a result end up more frequently disadvantaged in their decision making.

- Policy makers and practitioners are likely to want to develop career education interventions to support decision-making and more optimal career outcomes. In Canada, the Council of Ministers of Education (CMEC) describes career education as the composite of school-based activities and experiences designed to *prepare* and *engage* individuals in their career development.

- Those developing programs and resources to support youth career decisions face a dilemma. They must support career decisions for youth in different age groups, who may be at a wide range of stages in the process. Potentially, their support for each type and stage of decision should be packaged in multiple, age-appropriate ways, and they might be expected to develop mechanisms to ensure the right package reaches the right groups with respect to age and stage. This presents a large and complex task, made more difficult still because the literature is not yet clear on the ages that are appropriate to start considering or to finalize decisions on each stage.

- There have been observational and pre-post studies that associate positive outcomes with youths' experience of different career interventions, but it is hard to certain that that changes in youths' aspirations and decisions were due to the interventions. Multivariate models and use of longitudinal data can help in identifying the role of interventions and thus in analysis specification.

In this study, the focus initially has been on taking advantage of the randomized control trials embedded in the datasets SRDC has developed in recent years. These trials compare program groups of youth offered career education interventions to those in statistically equivalent control groups at the same schools who receive no new treatments but remain eligible for the career supports and financial aid normally available to students in those schools. These data are being used in this report for the first time to assess the long-term effects of career education on career path development. As this is secondary data analysis the study must be considered exploratory, not aiming to confirm hypotheses.

THE RESEARCH FRAMEWORK

The main research questions are:

- How do career interventions in different forms affect career aspirations and the path to career realization?
    - What is the effect of the availability of a career education workshop and/or an early guarantee of a PSE grant on matching career aspirations at Grade 9 to eventual program of study at any post-secondary education (PSE) level?
    - What is the effect of promoting and supporting academic engagement with specially-trained PSE-focused educators in high school on matching career aspirations at Grade 8 to eventual program of study at any PSE level?
    - What role does the availability of career education workshops and/or an early guarantee of a PSE grant play in matching career aspirations to early occupation?
    - What role does promoting and supporting academic engagement with specially-trained PSE-focused educators in high school play in matching career aspirations to a early occupation?
- What are the effects of parents, peers, teachers, and counsellors on the relationship between career education and career pathways?
- Which subgroups are more likely to switch or better match their career path due to career education?

Answering these questions represents only a start on filling knowledge gaps identified in the theoretical and evidence base review. They reflect the range of feasible indicators that could be specially derived for analysis from the currently available data. In general, by contrasting the

career aspirations of students at Grade 8/9 with their career and post-secondary expectations reported at Grade 12, the research team has developed indicators regarding changes in career decision making as well as the evolution of career clarity through the high school phase of their education. Then, using data on actual enrolment in post-secondary programs and on subsequent occupations the research team has derived indicators on each youth's implementation of their high school career plan. Finally the relationship between these indicators and characteristics of each youth at Grade 8/9 (across a wide range of information collected at each study's outset) can be assessed taking into account experimental group membership for insights on the effects of different career interventions for different groups of youth. This work uses multivariate (Probit) regression models to identify how career education affected the evolution of career decisions among Canadian high school students.

To answer the research questions, SRDC's team mapped roughly 7,000 students' occupational aspirations at Grade 8/9 for the first time to (a) their program choices collected in surveys when they were in Grade 12 and (b) their PSE and labour market outcomes two to three years following their departure from high school. Career aspirations with respect to occupation were collected as free text answers in the baseline surveys of the Future to Discover (FTD) and BC AVID Project randomized controlled trials (Hui and Ford 2018; Ford and Hui 2018). For this project, the team painstakingly coded these answers manually according to the National Occupation Classifications 2016 (NOC) using also students' expectation of highest level of education at baseline. If the answers were too broad to be specific to the 4-digit NOC, the team used 3-digit or 2-digit NOC instead. As a result, the number of codable NOC digits provides a proxy measure for the *clarity* of career aspirations at baseline. For the post-schooling employment occupation, the research team converted the originally coded occupation into NOC. The research team also coded the programs of study reported in the student surveys according to the Classification of Instructional Programs 2016 (CIP), with similar attention to *clarity* in educational aspirations.

The research team used control group responses in the data to establish two-way *empirical* linkage between post-secondary program CIP codes and the NOC of occupations. These matches determined the outcomes of interest: matches between career aspirations and program of study and occupation at different stages of the youth's career pathways i.e., stages reached and transitions made. The following indicators denote the matching and resulting outcome measures:

- A 0-1 indicator of a match between early career aspirations at Grade 8/9 and the intended program of study at any post-secondary education when the student reaches Grade 12: This is a proxy indicator of continuing the early career aspiration.

- A 0-1 indicator of improving career clarity: from unclear early career aspirations at Grade 8/9 to having a specific intended program of study at any post-secondary education by Grade 12.

- A 0-1 indicator of a match between the intended program of study at Grade 12 and the observed program of study at any subsequent post-secondary education level: This is a proxy indicator of carrying out the post-secondary plan.

- A 0-1 indicator of a match between career aspirations at Grade 8/9 and the observed program of study in any type of post-secondary education: This is a proxy indicator of carrying out the early career aspiration.

- A 0-1 indicator of a match between career aspirations at Grade 8/9 to the post-schooling career: This is a proxy indicator of realization of the early career aspiration.

- A 0-1 indicator of a match between the observed program of study in any type of post-secondary education and the post-schooling career: This is a proxy indicator of realization of the career plan through post-secondary education.

These six indicators represent the six career pathway 'outcomes' of interest in this report. They follow, roughly, a developmental sequence. Notably the analysis does not ascribe, as yet, a value to these outcomes. For example, *realizing one's early career aspiration* could prove on balance positive or negative for the individual concerned. The focus is on whether career education interventions of diverse types help or hinder each of the outcomes, and for whom. The aim is that later work (described in recommendations) will get closer to outcomes that assign values to the consequence for individuals' lives from experiencing these processes.

The literature review established youth are often in their career *exploration* stage until age 20. Youth can thus have low clarity on their career aspirations as well as less information or knowledge about the program requirements which hinders matching their career aspirations to a program of study. Therefore, the analytical model anticipated career indecision to exist for youth in both program and control groups. The exploratory analysis considered whether career education interventions as added to students' experiences at random by the FTD and BC AVID projects would *change* the pattern of the six career pathways outcomes for groups receiving these interventions. Because the interventions provided additional support or focus (or both) to prepare or engage youth in their career development, students could be helped by them in clarifying and realizing their career interests. The analysis was designed to detect (i) what intervention made a difference and (ii) to whom in either (a) switching from their initially unclear career aspirations to a clearer career plan, or (b) maintaining their career aspirations and being able to identify the steps they need to realize their aspirations at an early stage.

The interventions tested provided very different types of prompts to youth that might influence their careers. Different groups of youths experienced three interventions in four permutations (since one group received a combination of an early promise grant together with enhanced career education workshops). This diversity was intentional given that CMEC describes career education as the composite of school-based activities and experiences designed to *prepare* and *engage* individuals in their career development.

From the FTD project (51 high schools):

- **Learning Account (LA)** – A promise made at the end of Grade 9 of an $8,000 grant in Grade 9 automatically payable upon enrolment in postsecondary education over two years. LA removes a financial barrier to pursuing a career of interest. Having money on the table from the start of high school conditional on taking up a PSE program on graduation may motivate more consideration of PSE and thus help *engage* more in career development activities during their high school years. Many will consider it a relatively narrow and passive career education intervention providing youth only with information on guaranteed financial aid availability, albeit early enough to motivate changes in behaviour through high school, including seeking other sources of existing career support.

- **Explore Your Horizons (EYH)** – These expert-designed career education workshops support all participants in *preparing* for career development: a carefully constructed developmental sequence of classroom-based activities aimed to support youth (and, to some extent, their parents) in understanding how to use sufficient, unbiased information to focus on career choices (including the costs and benefits likely from pursuing different occupational choices) and also in guiding their behaviour as they try to navigate a path towards attainable and preferred careers.

- **LA+EYH** – Support for engagement and preparation with more certainty of the availability of financial aid, by combining the supports in the above two interventions.

The FTD sample is drawn as a representative sample from each participating school but only students from families with incomes below the provincial median ("lower-income families" below) could be offered LA. Hence analysis is partitioned by family income and results for higher-income families are only available for EYH on its own.

From the BC AVID project (14 high schools):

- **BC AVID** – Based on the well-established AVID program in 4,500 U.S. high schools. BC AVID promotes and supports academic engagement intended to change the high school experience

of students believed to have as-yet-untapped potential to succeed in PSE.[1] They attended elective classes with specially-trained PSE-focused educators to learn strategies for tackling more rigorous classes and with attention from AVID-trained counsellors throughout high school. BC AVID thus sought to both engage and prepare students by pushing them to strive for more ambitious career goals and opportunities, while supporting them to achieve them.

By examining how these interventions changed youths career pathway outcomes relative to the equivalent control groups who experienced educational programming, career counselling and financial aid as normally provided in the same high schools, the study has learned a great deal about the role played by such factors in career decision making, and how student characteristics, parents, peers, counsellors influence the experience of career education in high school.

THE RESULTS OF THE ANALYSIS

The results are complex, and we summarize them in eight tables. In short, the study found ample evidence to support the notion that career education in high school changes students' career choices and pathways. The following tables depict the main findings in terms of the direction of effects attributable to three factors:

1. The new career intervention (LA, EYH, LA+EYH or BC AVID).

2. The factors that *mediate* the interventions' effects. If the intervention influences something else in student's behaviour or experiences (like their academic grades in class) and that change has its own effect on the career pathway independent of the direct effect of the intervention we report that as a mediating effect. Furthermore, in the case of interactions with counsellors, peers and parents, the effect of these factors independent of the intervention are also reported.

3. The factors that *moderate* the intervention effects. If the intervention changes outcomes differently for different groups in the population depending on their circumstances (such as having parents who are themselves post-secondary educated or lower-income) we report the effect of these factors in moderating the effects of the intervention on the career pathway.

[1] Only students meeting strict selection criteria (see Ford et al., 2014) were included in the eligible population from which program and control groups were drawn.

Direct and mediating effects of career interventions

In Tables ES1 though ES5, the career pathway outcomes are shown across the top of each table in approximate chronological (age and stage) sequence. For each factor (1) and (2) above, a statistically significant positive impact is shown by a green upward arrow and a statistically significant negative impact is shown by a red downward arrow. While this simplifies the presentation, the magnitude of the effect is not given. These are provided in the text for notably large magnitude effects and are given in full in the main report and appendix. It is also worth recalling that positive direction effects do not equate necessarily to 'good' outcomes, nor negative direction effects to 'bad' outcomes. The reader is encouraged to interpret the change in each type of career pathway decision carefully.

Learning Accounts

For example, in the FTD project, LA was offered to students from lower-income families only. The information conveyed by this early guarantee of a post-secondary grant decreased the likelihood of students continuing with their early (Grade 9) career aspirations through Grade 12, as shown in the first column (1) and first row of table ES1, and (not shown) by 7 to 8 percentage points. The interpretation is thus that LA caused them to *change* their career aspiration. Changing a career aspiration over time is not necessarily 'good' or 'bad'. But we also note from the upward green arrow in the final column (6) of the first row that LA increased the probability that youth realized their career plan, i.e., that their later career aspiration matched their program of study at PSE. One interpretation of this is, overall, possibly 'good': LA caused students to change their early career aspiration to something they were more likely to realize in their career.

The analysis reported in the bottom panel of Table ES1 considers *mediating* effects. There are a combination of *direct* overall effects of LA on career pathway changes (negative on continuing the early career aspiration; positive on carrying out the post-secondary plan; negative on carrying out the early career aspiration and positive on realization of the career plan through PSE) and *indirect* effects, mediated by factors such as how LA changes parental values or below average academic engagement that in turn affect career pathway changes. For reference, in brackets (e.g., LA+) within the row labels are summaries of the significant impacts of LA on the mediating effects. These labels in Table ES1 show that LA reduces the proportion of students with below academic engagement, reduces the proportion participating in below average numbers of other career activities and increases the proportion who report their parents value PSE.

The coloured arrows then illustrate how the mediating effects that LA has an influence upon also have effects on career pathway outcomes. Having lower academic engagement is related to improving career clarity by Grade 12 but decreased chances of carrying out the early career

aspiration. But LA actually increases academic engagement – so the analysis finds that LA has an effect of reducing career clarity, not *directly* but because of the effect it has on academic engagement. There are many possible explanations for this counterintuitive result. One is that possibly students who are less academically engaged may have a fairly clear idea of what they want to do after school, taking up a job that is easier to obtain because it does not require further educational investment. But LA *reduces* the proportion *less* academically engaged, who tend to hold that type of career clarity by Grade 12, so career clarity declines.

Table ES1 What is the effect of the LA early promise grant on students' career pathways?

	Continuing the early career aspiration (Early NOC to early CIP) (1)	Improving career clarity (Early NOC to early CIP) (2)	Carrying out the post-secondary plan (Early CIP to later CIP) (3)	Carrying out the early career aspiration (Early NOC to later CIP) (4)	Realization of the early career aspiration (Early NOC to later NOC) (5)	Realization of the career plan through PSE (Later CIP to later NOC) (6)
Impact						
Learning Account	↓					↑
Mediating Effects						
Learning Account	↓			↓		↑
Below average academic engagement at Grade 12 (LA-)				↓		
Below average number of career activities at Grade 12 (LA-)		↑			↓	
Parent valued PSE (LA+)				↑		

Other findings in the bottom panel are perhaps easier to explain. By increasing the proportion engaging in other career activities, LA decreases realization of the early career aspiration. LA increases the proportion realizing their career plan through PSE only through its direct effects. LA tends to increase parental valuation of PSE which in turn tends to increase carrying out the early career aspiration but LA reduces the proportion with below academic engagement which in

turn reduces carrying out the early career aspiration, so these mediating effects tend to 'cancel out'. Once these mediating effects are taken into account, furthermore, LA has an additional direct effect on decreasing carrying out the early career aspiration. Overall all these effects in the lower panel tend to cancel each other out overall other than for columns 1 and 6. So, while LA generates a lot of different direction effects for different youth over time, the overall impact of offering LA remains the result in the first row, decreasing continuation of the early career aspiration and increasing realization of the career plan through PSE.

Explore Your Horizons

The remaining tables present findings in similar ways. Results for the EYH enhanced career education workshops are spilt over the next two tables. Table ES2 focuses on the same lower-income student population as Table ES1. The effects are similar to LA in that EYH decreases continuing the early career aspiration (by 4 to 6 percentage points). It also reduces carrying out and realizing the early career aspiration. Perhaps importantly, there are no significant mediating effects meaning the effect of career education on lower-income students changing their career pathway was predominantly direct (for students from lower-income families EYH had no significant effect on factors such parents' values, other career activities or academic engagement).

Table ES2 What is the effect of enhanced career education (lower-income families) on students' career pathways?

	Continuing the early career aspiration (Early NOC to early CIP) (1)	Improving career clarity (Early NOC to early CIP) (2)	Carrying out the post-secondary plan (Early CIP to later CIP) (3)	Carrying out the early career aspiration (Early NOC to later CIP) (4)	Realization of the early career aspiration (Early NOC to later NOC) (5)	Realization of the career plan through PSE (Later CIP to later NOC) (6)
Impact						
Explore Your Horizons (Lower-income)	↓			↓	↓	
Mediating Effects						
Explore Your Horizons (Lower-income)	↓					

Among higher-income students in Table ES3, EYH enhanced career education workshops reduced the percentage of students carrying out their post-secondary plan (by 9 percentage points). As with lower-income students, EYH reduced carrying out and realizing of the early career aspiration (by 5 to 6 percentage points), suggesting such workshops brought about a major change in their choices during their late high school years. For higher-income students, EYH increased realization of the career plan through PSE.

Among mediating effects in the lower panel of Table ES3, EYH tended to increase the proportion of youth from higher-income families attaining high grades and increased their volunteering activities. But since higher grades are associated with continuing the early career aspiration but volunteering is associated with reducing it, these effects approximately "cancel out" (students changed career pathway in both directions via these mediating factors due to EYH). Thus, there is no overall change seen in students continuing their early career aspiration. The effect of EYH on increasing volunteering, reduces carrying out the post-secondary plan overall. Volunteering thus seems to be an important mediator for higher-income students leading to changes in their career direction during the high school years.

EYH led to increased participation in other career activities for higher-income students and so via this indirect route, EYH increased career clarity. This effect on career activities accounted for some of EYH's effect on reducing realization of the early career aspiration, because for higher-income students these other career activities tend to cause students to pursue a different career from the one they aspired to in early high school.

EYH increased parents' valuation of PSE and while this tends to increase the tendency of students from higher-income families to carry out their early career aspiration, the direct effect of EYH on changing students' chosen education program away from their earlier occupational preference was stronger, making this the dominant direction of EYH's effects on carrying out earlier aspirations. Also, enhanced career education in high school increased the proportion of students who obtained occupations matching their education at PSE without any mediating effects.

Table ES3 What is the effect of enhanced career education (higher income) on students' career pathway?

	Continuing the early career aspiration (Early NOC to early CIP) (1)	Improving career clarity (Early NOC to early CIP) (2)	Carrying out the post-secondary plan (Early CIP to later CIP) (3)	Carrying out the early career aspiration (Early NOC to later CIP) (4)	Realization of the early career aspiration (Early NOC to later NOC) (5)	Realization of the career plan through PSE (Later CIP to later NOC) (6)
Impact						
Explore Your Horizons (Higher-income)			↓	↓	↓	↑
Mediating Effects						
Explore Your Horizons (Higher-income)			↓	↓	↓	↑
Average grade >= A at Grade 12 (EYH-HI+)	↑					
Volunteering activities at Grade 12 (EYH-HI+)	↓		↓			
Below average number of career activities at Grade 12 (EYH-HI-)		↑			↓	
Parent valued PSE (EYH-HI+)				↑		

Learning Accounts plus Explore Your Horizons

When the early promise grant was offered in combination with enhanced career education (LA+EYH) to youth from lower-income families, the results were very similar to those for LA on its own. There are few differences in Table ES4 from Table ES1. When mediating factors were taken into account in the analysis, there was less often a residual direct effect of LA+EYH on career pathways outcomes (e.g., no direct effect on (1), (3) and (4)) from the combination of interventions compared to LA on its own. There is much less similarity to the effects of EYH on

its own for the same population. One conclusion is that as far as student decisions on their career pathways are concerned, LA tends to drive the actual pattern of changes over time more than the EYH component (even though plausibly EYH may be working to influence the nature of those changes in the form of specific and education and occupation choices that are not being examined here).

BC AVID

Unfortunately, because the AVID final survey was less than two years after the completion of high school (assuming no breaks in education), less valuable information on occupation was captured. The only career pathway outcome modelled was carrying out the early career aspiration (Table ES5). Still, this is a very important outcome given the intent of BC AVID programming to ensure students (selected for the program as they were believed to have as-yet-untapped potential to succeed in PSE) pursue a PSE pathway. The program mechanism is captured in 11 'essential' steps to increase the rigour of their coursework. BC AVID provides, in the context of an elective class, several different kinds of support for their academic advancement. The results indicate BC AVID led more students to pursue education unmatched to their Grade 8 occupational aspiration. In line with the program intent BC AVID increased academic engagement by Grade 12, when more academic engagement tends to be associated with carrying out early career aspirations. But this effect was small. As a result, the direct impact of BC AVID on carrying out the early career aspiration was a negative 10.2 percentage points, similar to the estimated overall impact of negative 10.4 percentage points.

Counsellors, peers, and parents

The analysis went on to consider the roles of three groups of people anticipated to have an influence on students' formation of career aspirations and career planning. This was mainly to determine what role they play when students received more structured career education interventions: treating the students' self-reports of different types of interaction with these people by Grade 12 as mediating factors on the effects of career education in FTD and BC AVID projects.

Table ES4 What is the effect of LA+EYH adding an early promise grant to enhanced career education on students' career pathway?

	Continuing the early career aspiration (Early NOC to early CIP) (1)	Improving career clarity (Early NOC to early CIP) (2)	Carrying out the post-secondary plan (Early CIP to later CIP) (3)	Carrying out the early career aspiration (Early NOC to later CIP) (4)	Realization of the early career aspiration (Early NOC to later NOC) (5)	Realization of the career plan through PSE (Later CIP to later NOC) (6)
Impact						
Learning Account & Explore Your Horizons	↓					↑
Mediating Effects						
Learning Account & Explore Your Horizons						↑
Below average academic engagement at Grade 12 (LA+EYH-)		↑		↓		
Confident about future career (at 66-month survey) (LA+EYH+)			↑			↑
Below average number of career activities at Grade 12 (LA+EYH-)					↓	
Parent valued PSE (LA+EYH+)				↑		

Table ES5 What is the effect of BC Advancement Via Individual Determination on students' career pathways?

	Carrying out the early career aspiration (Early NOC to later CIP)
Impact	
BC AVID	
Mediating Effects	
BC AVID	

The role of counsellors, peers and parents in students' career planning has been documented extensively, including in this project's literature review (SRDC 2020). Although Table ES6 includes in the first three rows the direct effects of counsellors, peers and parents for youth participating in the FTD projects, it is difficult to draw conclusions about their impacts on career paths. For example, the needs and knowledge of students who talk to a career counsellor (or a parent) or who have PSE-positive peers are likely different from those who do not. Therefore, the analysis cannot attribute observed differences in career pathways between students who talked to a career counsellor and those who did not as the effects of career counsellors. The differences may reflect the inherent difference of the groups of students who choose to speak with counsellors (engage with parents, have PSE-positive peers).

For this summary, we present only the mediating effect for students from lower-income families in relation to EYH as the effects for LA, LA+EYH and EYH for students from higher-income families follow a broadly similar pattern.

- While talking to parents is associated with continuing the career aspiration, EYH reduces this effect in line with the overall effect of EYH, reducing continuation of the career aspiration.
- Having PSE-positive peers did not lead to improved career clarity. But these peers enhanced the positive effects of EYH and LA on improving career clarity for those who did not have high clarity of career aspirations in Grade 9.
- Almost universally, engagement with any of counsellors, peers and parents was associated with a lower likelihood of carrying out the original post-secondary plan, and having access to

career education further amplified that effect. Those who had PSE-positive peers and participated in the EYH workshops had a lower likelihood (between 19.5 and 24.4 percentage points lower) of carrying out the post-secondary plan, suggesting peer influences are very important (in the presence of career education) in changing post-secondary choices.

- Engagement with counsellors, parents and peers increased the chances of carrying out the early career aspiration which runs counter to the direct effect of the career interventions which tended to reduce carrying out the early aspiration. There was no significant interaction between the effects of interventions and counsellors, peers, and parents with respect to carrying out the early career aspiration.

Table ES6 What are the effects of counsellors, parents, and peers on the relationship between career education and career pathways?

	Continuing the early career aspiration (Early NOC to early CIP) (1)	Improving career clarity (Early NOC to early CIP) (2)	Carrying out the post-secondary plan (Early CIP to later CIP) (3)	Carrying out the early career aspiration (Early NOC to later CIP) (4)	Realization of the early career aspiration (Early NOC to later NOC) (5)	Realization of the career plan through PSE (Later CIP to later NOC) (6)
Counsellor		↓	↓	↑		
Talking to Parents	↑		↓	↑		
PSE positive Peers			↓	↑		
Career education x Talk to career counsellor						
Career education x Talk to parents	↓		↓			
Career education x PSE positive peers		↑	↓			

Similar analyses for BC AVID (not shown in Table ES6) yielded no significant effects.

These results suggest that high schoolers' career direction is, as expected, associated with interaction with the counsellors, parents, and peers, but the direction of influence can be opposite to the effect of career education interventions.

Moderating effects

Career outcomes are affected by family background. The effects of career education may thus also be expected to vary by parental education and income. Tables ES7 and ES8 consider the important role parental education plays in moderating the effect of career education in FTD. A similar analysis examining the role of household income in moderating the effect of the BC AVID yielded statistically insignificant results.

Table ES7 What are the effects of FTD interventions on the career pathways of students whose parents had a high school or less education?

	Continuing the early career aspiration (Early NOC to early CIP) (1)	Improving career clarity (Early NOC to early CIP) (2)	Carrying out the post-secondary plan (Early CIP to later CIP) (3)	Carrying out the early career aspiration (Early NOC to later CIP) (4)	Realization of the early career aspiration (Early NOC to later NOC) (5)	Realization of the career plan through PSE (Later CIP to later NOC) (6)
Learning Account						
Explore Your Horizons (Lower-income)						
Explore Your Horizons (Higher-income)						
Learning Account & Explore Your Horizons						

Among students for whom neither parent had education beyond high school, LA led to switching their early career aspirations as early as Grade 12 (Column (1) of Table ES7) by 18.1 percentage points. This impact among students with post-secondary-educated parents (Column (1) of Table ES8) is small and not significant. However, EYH workshops and the combination of LA+EYH had similar impacts, causing switching, regardless of parents' educational attainment.

Importantly (but not shown in Tables ES7 and ES8) FTD interventions had *larger* impacts on career pathways among students with lower-educated parents than those with post-secondary-educated parents. The only exception was a large impact of the early guarantee of the LA post-secondary grant on the realization of early career aspirations among students with post-secondary-educated parents. Taking the results in both paragraphs together, it seems that in the absence of the career education workshops, LA enabled the early career aspirations students with post-secondary educated parents had formed to be carried out. But LA shifted students with less educated parents away from their early career aspirations.

LA had a positive impact on the likelihood of youths realizing their career plan through PSE (Column (6) of both tables) regardless of parental educational attainment. However, the impact was slightly larger among students with lower-educated parents (at 17.0 percentage points) compared to those with post-secondary-educated parents (at 12.6 percentage points). The positive impacts of EYH workshops on students from higher income families are also concentrated among those with lower-educated parents (at 9.6 percentage points).

In summary, FTD interventions had mostly larger impacts on career pathways among students with lower-educated parents than those with post-secondary-educated parents. The only exception is the larger impact of the early guarantee of a post-secondary grant on the realization of early career aspirations among students with post-secondary-educated parents.

Table ES8 What are the effects of the FTD interventions on the career pathways of students whose parents had post-secondary education?

	Continuing the early career aspiration (Early NOC to early CIP) (1)	Improving career clarity (Early NOC to early CIP) (2)	Carrying out the post-secondary plan (Early CIP to later CIP) (3)	Carrying out the early career aspiration (Early NOC to later CIP) (4)	Realization of the early career aspiration (Early NOC to later NOC) (5)	Realization of the career plan through PSE (Later CIP to later NOC) (6)
Learning Account					↓	↑
Explore Your Horizons (Lower-income)						
Explore Your Horizons (Higher-income)						
Learning Account & Explore Your Horizons						

CONCLUSIONS

The results are complex so it may help to characterize them with some general unifying conclusions. With so many findings, it is important to draw out some generalities even when this is at the risk of dropping some qualifications or exceptions made clear in the report. Our initial assessment draws out the following broad conclusions on the patterns seen and their plausible explanations:

- The LA early guarantee of a post-secondary grant and EYH offer of career education workshops appeared to directly impact lower-income students, switching them away from their early career aspirations. Perhaps challenging some assumptions in the literature, career education is especially influential for students from lower-income families.

- There is evidence that the effect of EYH workshops for students from higher-income families was more often indirect, inducing them to increase volunteering activities. Among this group, more tended to change career paths as an effect of the volunteering. This pattern was not evident among lower-income students offered the same workshops.

- Career education interventions typically increased the number of other career-related activities students engaged in, which appeared in turn to delay some disinterested students from entering the labour market via easy-to-obtain jobs straight after high school.

- The EYH career education workshops altered the proportions of students from higher-income families experiencing mediating factors (participation in more 'other' career activities, high parental valuation of PSE and increased volunteering) but had no effect on the prevalence of these experiences for students from lower-income families. However, LA did change these experiences (and increased academic engagement) when offered on its own or in combination with LA. This suggests that such students are unlikely to additionally engage in career-related responses (behaviours and activities) available to them unless they are guaranteed the financial barrier to PSE is going to be addressed. This is an important policy point. That said, EYH alone did have *direct* impacts on career pathway outcomes (continuing the early career aspiration; improving career clarity; carrying out the postsecondary plan) just not via the analyzed potential mediating factors.

- Relatedly, the findings are consistent with career interventions realigning students' early focus, choices, and plans more often for those whose parents had not attended PSE (whose children typically are less likely to access PSE) while doing more to reinforce the existing early choices and plans among those whose parents had attended PSE (who are typically reported as better able to promote PSE as a destination to their children).

- Notably, the interventions decreased the likelihood that students from lower-income households carried out their early career aspirations directly suggesting that career programming is more effective changing the focus and choices of youth with more disadvantaged backgrounds.

- Both the LA early guarantee of a post-secondary grant and EYH career education workshops increased parents' valuation of PSE (the EYH career education workshops included a component targeting parents, but LA did not). Interventions including LA and BC AVID increased students' academic engagement. These changes in turn influence outcomes such as career clarity, and whether youth carry out their early career aspirations. 'Having parents who value PSE' and 'increasing academic engagement' are associated with an increased likelihood of carrying out the early career aspiration. At the same time, increasing academic engagement reduces career clarity, perhaps due to increasing the range of attainable PSE options.

The study also found evidence of career teachers/counsellors, parents, and peers influencing the impacts of career education. Talking to a career counsellor did not seem to change much the impacts of FTD interventions on students' career pathways, though the combination of the LA early guarantee of a post-secondary grant and talking to the career counsellor helped students stay on track to carry out their early career aspiration. Engagement with parents was associated with a higher likelihood of continuing and carrying out early career aspirations, though lower-income students offered the LA grant appeared more often to need to engage their parents in order to change their career choices through PSE. Parents' role seemed to diminish once students entered PSE or the labour market. Finally, peers with a positive view of PSE influenced how students offered career education finalized their post-secondary choices.

RECOMMENDATIONS

While a large set of findings that sheds important light on poorly understood yet critical stage of youth career-decision making has been generated, much more needs to be done.

Adding meaning to the outcomes

The analysis of FTD and BC AVID data has focused on the factors influencing the career decisions of high school students: what changes the direction of career pathways and for whom. We have found what types of intervention can be effective and examined differences for some subgroups, including mediating factors. But the project has not ascribed any particular value to the changes in career pathways. This reflects what can be undertaken with the data so far accessible and coded. But policy makers and practitioners who would like to change youths' decision making

are typically seeking to do so with a purpose. There are many different possible purposes, for example:

- to improve life chances of the youth involved (health, wellbeing, earnings);
- to improve the functioning of the labour market or economy, including minimizing disruption in future, adult career transitions;
- to reduce the time spent out of work or NEET, underemployed, or in occupations where their skills are misaligned with the tasks they must perform.

In other words, it will be helpful to align youth long-term outcomes to meet some pre-defined set of needs so as to add meaning to the way career education influences the pathways chosen. Then it could be possible to use the same data to determine factors associated with better meeting those pre-defined needs and (ultimately) recommend changes in career programming to better meet the needs.

More simply, occupational outcomes might be ascribed values in relation to labour market demand, average earnings or levels of occupational satisfaction. We recommend pursuing as many of these steps as possible in future analysis to help ascribe more meaning to the outcomes reported here.

Supporting career education for lower-income students

This exploratory study found evidence to support the notion that career education in high school changes students' career choices and pathways. While the full consequences of different career pathway decisions will await the above recommended work or equivalent new studies, it is already apparent that there is a disparity between socio-economic groups. Students with a lower socioeconomic status start with less clarity in career aspirations or less often have firm career plans than their counterparts from families with higher socioeconomic status. Perhaps encouragingly, career education interventions seem disproportionately to help those without postsecondary-educated parents and from lower-income families clarify their career plan (and thereby result in more changes for these youths to their intended program of study at Grade 12 relative to their intent at Grade 8/9) compared to students with a higher socioeconomic status.

The reliance of more disadvantaged youth on support directly provided to them from the education system (rather than behaviours and supports they must seek out and initiate) may warrant a reconsideration of how services are structured and the types of support provided. Previous studies using this same FTD dataset have shown how youth from lower-income families are strongly influenced by career education and early guarantees of student aid (Hui & Ford, 2018). It seems relevant to recommend making appropriate versions of such career supports

available more universally to support all students who might miss out on other sources of career development support. Moreover, given youth may be disproportionately supported by the education system in this respect, care in the design of such supports and investigation of the appropriateness of the outcomes they lead to is advised.

Raising the profile of longitudinal research on career decisions

Career decision making is, by definition, a long-term endeavour of critical importance to the life chances of individuals and the functioning of economies. It is perhaps surprising that there has been relatively low recent investment in data that can help youth, those who advise and support them and policy makers, understand the consequences of those decisions and the environments that support the most optimal outcomes. Critical pieces of Canada's data infrastructure are missing. We recommend harnessing findings such as those from this study into knowledge mobilization efforts with a view to improving the infrastructure for longitudinal data analysis on Canadians' career pathways.

MOVING FORWARD

Career decision-making is a complex process with many inputs and outcomes. Many studies break the process down to simplify the analysis and presentation of findings. By starting with a comprehensive literature review and using two rich longitudinal data sets with four experimental treatments spanning ten years of young Canadians' lives, this project has learned a great deal about the many influences at work and their consequences by taking a different approach. One price has been that it has proven difficult to simplify and summarize the findings.

To move forward, the authors need to continue their work to make more sense of the findings. At the risk of further complication, the work cannot proceed with considering critical further dimensions influencing decisions and career education access such as gender and linguistic heritage. As well, we should explore application of the data analysis approach used here to new datasets (or participate actively in their creation) to be able to embrace Indigenous and racialized dimensions of career decision making.

The authors will continue these early efforts to mobilize the knowledge already gained, to increase its relevance to practitioners and its utility to decision makers. By presenting the work in different forums and formats we hope to gain peer advice and insights that will improve the usefulness of the findings. Vitally, young people themselves need to be engaged in interpreting findings, shaping future analysis, and co-designing new career interventions to test. We also hope other analysts will be motivated to use FTD data – publicly available in Statistics Canada

Research Data Centres – and other newly linked longitudinal data, to explore outstanding questions on youth career development.

This study is using secondary data analysis – the data were generated for an original purpose set in 2003 that is different from the knowledge needs of the 2020s going forward. The workplan moving forward from this exploratory study includes:

- Developing proposals to continue this study that will support additional data analysis, including applications to Statistics Canada to link additional youth outcomes from tax records and improve the meaning of the findings obtained here.
- Proposing and running new studies specifically to test the hypotheses being generated, to incorporate the impact of online high school career interventions such as Xello and myBlueprint, and other recent rapid improvements in labour market information that has become more mainstream over the period since FTD and BC AVID began.
- Projecting the results onto the labour market and educational realities of the 2020s, to ensure further recommendations are relevant to an era transformed by the consequences of the COVID-19 pandemic, automation and artificial intelligence, other influences on labour market precarity, new online learning as well as diversity and inclusion.

INTRODUCTION

Canada is an international leader on many indicators of K-12 education performance (OECD, 2010a) and has among the highest rates of PSE attainment of all OECD countries (Buchanan, 2013). Yet it still has a significant proportion of youth who leave the formal education system ill equipped for their transition to the world of work. Transition "derailment" can take many forms:

- Students leaving high school before graduating;
- High school graduates who go straight to the workplace but struggle to provide the job skills required of them;
- High school graduates who go on to apprenticeships, college or university but drop out or switch inefficiently, citing a lack of "fit";
- PSE graduates who secure employment after graduation for which they are substantively overqualified, who can then question the investments they made in PSE (which can, in turn, deter others from making educational investments) and feel dissatisfaction with their work; and
- PSE graduates who struggle to demonstrate the skills required by employers, who seek to switch occupations or upgrade their skills further.

According to Connelly, Blair and Ko (2013), Canadian students typically exit education with insufficient career education and first-hand experience of the labour market: "*fewer and fewer students leave high school with exposure to the world of work, yet we expect them to choose post-secondary education pathways that will lead to a career*" (p. 13). If students leave high school without a basic idea of who they want to become and are under- or misinformed about the relevant opportunities open to them, it becomes inevitable that they will not plan appropriately and find themselves making, what in retrospect turn out to be, poor choices. Even among those who enter into PSE, a substantial number leave before completing – and therefore fail to reap the full rewards of their investment (and governments' and others' investments) in their education.[2]

Derailed transitions can cost students valuable time and money – relative to a successful transition – as they engage in education without gaining a credential or the full benefit of the investment. The chances of ending up in precarious employment or unemployment can

[2] Oreopoulos and Petronijevic (2013) report that those who participate in PSE but do not complete do still see a return relative to what they would achieve if they had not chosen PSE at all.

increase.[3] The situation can become chronic if they cycle through periods of work, poorly focused re-training and unemployment. They may ultimately find themselves losing self-confidence due to unemployment or underemployment.

For the above reasons, governments and other decision-makers in diverse programming that affects youth such as education planners, career counsellors and youth support workers strive to deploy the most effective measures to target youth at different stages of their educational and early labour market careers. Well-designed support programs to aid in career-decision choices need to be delivered in ways that help the youth grow into discerning consumers of education, who know when and how they should invest in their futures for optimal impact on their later lives. The refinement and customization of career education need to be founded on the best evidence concerning how such interventions best fit into youth's decision-making.

This project is investigating the role of career education on students' educational choices and post-secondary outcomes using two rich longitudinal data sources created through two of Social Research and Demonstration Corporation's (SRDC's) pilot projects. The research team has been working with funding from CERIC to examine how piloted early career education interventions and other tracked career-related activities experienced by high school student participants in the BC Advancement Via Individual Determination and Future to Discover pilot projects affected the evolution of their career decision making.

The Future to Discover (FTD) Pilot Project was established in 2003 by the Canada Millennium Scholarship Foundation to test two interventions: Explore Your Horizons (EYH) and Learning Accounts (LA). Explore Your Horizons introduced enhanced career education workshops and activities for students in Grades 10, 11 and 12 and their parents. Learning Accounts tested an early guarantee of a grant of $8,000 to pursue PSE, made available only to youth from lower-income families. Participating high school students were told as they transitioned from Grades 9 to 10 that they could receive the grant only if they enrolled in PSE (university, community college, apprenticeship, or private vocational college). BC Advancement Via Individual Determination (BC AVID) tested a new type of elective class intended to promote the academic engagement of middle-achieving youth (including learning skills and motivation) to improve their educational trajectories. The class ran from Grade 9 through Grade 12. In addition to being taught "learning to learn" skills, AVID class members benefited from group tutorials with post-secondary student tutors and campus visits. Those in the AVID class also received career-planning support from an AVID-trained counsellor. Very importantly for this plan of analysis, all three of these interventions (EYH, LA, AVID class membership) were randomly assigned to the participants. All participants who agreed to participate in the projects were assigned through a lottery-like process a place in the treatment group offered a new intervention or a place in the

[3] Again though, as Arcidiacono et al. (2014) have argued, there is still value in trying out college and deciding against it versus not trying it out at all.

control group who received "business as usual" education support and eligibility for student aid as available at the time. The data collection on the education experiences of treatment group participants over the ten years following random assignment was identical to the data collection for control group participants. Furthermore, random assignment means that at the project outset the control group participants were statistically identical on average to the program group participants. Comparisons are documented in SRDC (2007). The design of both data sets allows a high level of confidence in the estimates of causal effects of the designated interventions.

INTERVENTION DESIGN

The term 'career education' is used in a very broad sense in this report to cover four diverse combinations of additional information and support, up to and including the offer of a four-year elective class focused on accessing PSE that replaced another elective in the high school schedule of the students who chose it. The *Explore Your Horizons* intervention conforms most closely to the traditional conceptualization of career education. *Learning Accounts* can be interpreted as a PSE incentive or financial aid but because it was a guarantee of a grant made early (at the end of Grade 9) to be offset against more traditional student aid received, it acted more as a form of career planning signal or labour market information. LA provided information to those students from low-income families who received the offer that they definitely could afford to pay some or all of the direct costs of PSE should they go, removing a barrier that might have restricted their career decision making during Grades 10 through 12.[4] Combining the two, *Learning Accounts plus Explore Your Horizons*, gave students information on financial aid (perhaps interpreted as a reassurance on the affordability of PSE) alongside a set of resources to help decision-making and actually access PSE. *BC AVID* included post-secondary focused career education instruction alongside a host of other supports for navigating high school and PSE application processes, including information on occupational choices and student financial aid. The range of services and information being offered to youth under these interventions we label 'career education' varied quite widely, as explained further below.

Explore Your Horizons

EYH was designed to facilitate participants' development of their own post-secondary plans based on their passions and interests. It engaged parents as allies and existing post-secondary

[4] The amount of LA offset receipt of other student aid. Ford Hui and Kwakye (2019) show that offering learning accounts reduces the amount of student financial aid grants and loans students receive by $2,007. The average amount of Learning Accounts received by the treatment group was $2,737. Learning Accounts thus does not so much act as an additional source of funds to make PSE more affordable. Rather it increases early certainty of that affordability.

students as role models. The program provided enhanced career education through voluntary, after-school sessions beginning in Grade 10.

EYH participants were invited to take part in 40 hours of after-school project activities over a three-year period (Box 1). These activities provided enhanced career education and focused information on post-secondary studies intended to go beyond what was otherwise available in Manitoba and New Brunswick high schools. Leading experts, including researchers and practitioners, in the field of career development, designed the package of sequentially and developmentally appropriate material. The information was delivered through workshops facilitated by project staff, including guidance counsellors or educators and post-secondary students serving as role models. A project magazine and a website were also available to students in order to reinforce workshop content alongside focused information on PSE. The EYH curriculum as a whole was designed to permit other jurisdictions to integrate the materials with their own.

EYH activities attempted to help students make sense of the range of occupational and post-secondary choices and estimate the benefits and costs of each. The intent was to help overcome any informational or motivational barriers to higher education that under-informed or misinformed students might have so that they might make meaningful decisions about their futures. The intervention involved an exploration of all post-secondary paths — apprenticeships and vocational training as well as college and university. A full description of EYH Year 1 activities may be found in the FTD Early Implementation Report (SRDC, 2007, Chapter 5) and later activities in the FTD Interim Impacts Report (Smith Fowler et al., 2009).

EYH was offered to lower-income and higher-income students in the same classes. The results are presented separately in the analysis that follows to make it easier to compare results with those of Learning Accounts that was offered only to students from lower-income families.

Box 1: Explore Your Horizons Components

Component	Rationale	Frequency in Grade 10	Frequency in Grade 11	Frequency in Grade 12
Career Focusing	To help high school students explore career and education options and develop suitable career education plans. Parents are invited to the final session.	6 workshops of 2 hours (12 hours)		
Lasting Gifts	To help parents understand career development and how to support their children through the process. Parents and children are invited to attend all sessions together.		4 workshops of 2 hours (8 hours)	
Future in Focus	To help students manage transitions and build resilience to overcome challenges, such as through support networks. Parents are invited to the final session.			4 workshops of 2 hours (8 hours) plus orientation session
Post-secondary Ambassadors	To promote career exploration and education planning by establishing connections between high school students and students currently enrolled in a range of PSE and training programs.	2 workshops of 2 hours (4 hours)	2 workshops of 2 hours (4 hours)	2 workshops of 2 hours (4 hours)
Future to Discover Website	To provide information about career and education planning to encourage education and training after high school. Profiles, articles, and quizzes are presented in a colourful format designed to be appealing to youth.	Accessible throughout Explore Your Horizons. Participants gain graduated access to more site information over the three-year period.		
***F2D* Magazine**	Same as for the Future to Discover Website above.	2 issues	2 issues	2 issues

Learning Accounts

LA promised PSE funding to students in New Brunswick high schools with a family income at or below the provincial median. The funding commitment was made as they completed Grade 9 and entered Grade 10, long before they could apply for regular student financial-assistance programs, and at a time when it might more effectively influence their decisions about whether to continue their studies past high school and their course choices and levels of effort during high school. Unlike other programs that make early commitments of aid, access to LA was not conditional on students' educational achievement in high school.

The early guarantee was a bursary of up to $8,000 for participation in a full-time post-secondary program. Students were told that by attending a New Brunswick high school and successfully completing each consecutive school year until graduation and by successfully enrolling in a PSE program (recognized by the Canada Student Loans Program) they would receive up to $4,000 in each of two years of post-secondary study.

At the end of both Grade 10 and Grade 11, participants in LA received statements noting deposits in their accounts of $2,000 for each year successfully completed. LA participants had another instalment of $4,000 deposited into their accounts upon graduation from a New Brunswick high school. The accumulation of funds over time was intended to recognize each participant's continued commitment to education and to encourage reflections on life after high school. Eligibility for the LA intervention was determined using data from income tax returns provided by their parents.

Those lower-income students who received the offer of a LA may have realized earlier than they otherwise would have that pursuing PSE can be an affordable and realistic option. In turn, this may have led them to undertake better planning for the future. Alternatively, or in addition, the accumulated funds could help students overcome financial barriers by reducing the costs associated with PSE.

BC AVID

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 post-secondary access for "students academically in the middle" (Dunn et al., 2008, p. 2). The BC AVID 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 PSE 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 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."

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. Ideally, current post-secondary students lead the tutorials. 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 post-secondary campuses, all intended to promote the idea that post-secondary 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. 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 post-secondary 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 post-secondary 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 post-secondary application and financial aid systems. In U.S. implementations, the emphasis is typically placed on university application and enrolment. The BC AVID Pilot Project was intended to determine the effect of offering AVID on access to any type of PSE.

DATASETS

The data collected from these two randomized trials documented the ten-year path of about 7,000 young Canadians since Grade 8 (BC AVID) and Grade 9 (FTD). The information collected included their occupational aspirations as high school students at roughly age 14, their post-secondary and career expectation at roughly age 17, their actual PSE, their post schooling occupation, and their earnings outcomes. The original pilot project analyses (see, for example: Ford et al., 2014; Hui & Ford, 2018) focused on the various post-secondary attainment impacts of the interventions. The interaction between various career development components, parental and environmental influences and the evolution of students' career choices has not been examined in detail before this report. Indeed, the preceding report *The role of career education*

on students' education choices and post-secondary outcomes: Theoretical and evidence base preparation (SRDC, 2020) for this project found a lack of quantitative longitudinal analysis of the evolution of career decision making among high school students, especially in the Canadian context. The empirical research in this project aims to fill this gap in the literature and complement the understanding of key influences documented in the earlier report.

For the FTD data, the quantitative analysis first compares and contrasts the four groups that were randomly assigned: the EYH group, the LA group, the LA+EYH group who were eligible for both Explore Your Horizons and Learning Accounts, and the comparison group who were not offered any of these interventions. For the BC AVID data, the analysis first compares two randomly assigned groups in the pilot: the program group who were offered a seat for four years in the elective class and the comparison group were not eligible to participate in the BC AVID program. The analyses go on to examine the effects of parents, peers, teachers, and counsellors on the relationship between career education and career pathways.

This report presents the findings of all the quantitative analysis completed. The key findings are summarised at the end of the analysis to provide understanding of the key lessons learned with respect to career education. Although the pilot project included a randomized control trial designed to generate strong casual-impact inferences, this project can only be considered an exploratory analysis because the data were not collected with the purpose to examine the detailed evolution of career decisions.

THE RESEARCH FRAMEWORK

The main research questions this project seeks to answer are:

- How does career education affect career aspirations and the path to career realization?
    - What is the effect of the availability of a career education workshop (EYH) and/or an early guarantee of a PSE grant (LA) on matching career aspirations at Grade 9 to eventual program of study at any PSE level?
    - What is the effect of promoting and supporting academic engagement with specially-trained PSE-focused educators in high school [a specially trained AVID teacher and school counsellor] (BC AVID) on matching career aspirations at Grade 8 to eventual program of study at any PSE level?
    - What role does the availability of career education workshops (EYH) and/or an early guarantee of a PSE grant (LA) play in matching career aspirations to a career?
    - What role does promoting and supporting academic engagement with specially-trained PSE-focused educators in high school (BC AVID) play in matching career aspirations to a career?
- What are the effects of parents, peers, teachers, and counsellors on the relationship between career education and career pathways?
- Which subgroups are more likely to switch or better match their career path due to career education?

These questions are the culmination of earlier work by SRDC on the theoretical and evidence base review and research framework. They reflect the range of feasible indicators that could be specially derived for analysis from the collected data. In general, by contrasting the career aspirations of students at Grade 8/9 with their career and post-secondary expectations reported at Grade 12, the research team can develop indicators regarding changes in career decision making as well as the evolution of career clarity through the high school phase of their education. Then, the research team analyzed data on actual enrolment in post-secondary programs and on subsequent occupations to derive indicators on actual implementation of the high school career plan. They then assessed the relationship between these indicators and characteristics of each youth at Grade 8/9 (across a wide range of information collected at each study's outset) taking into account experimental group membership for insights on the effects of

different career interventions for different groups of youth. This work uses multivariate regression models to identify how career education affected the evolution of career decisions among Canadian high school students.

INDICATOR DEVELOPMENT

The process to answer the research questions began with SRDC's team mapping students' occupational aspirations at Grade 8/9 to (a) their program choices at Grade 12 and (b) PSE and labour market outcomes following their departure from high school. Career aspirations with respect to occupation were collected as free text answers at the baseline survey. For this project, the research team painstakingly coded these answers manually according to the National Occupation Classifications 2016 (NOC) using also students' expectation of highest level of education at baseline. If the answers were too broad to be specific to the 4-digit NOC, the team used 3-digit or 2-digit NOC instead. As a result, the number of NOC digits provides a proxy measure for the clarity of career aspirations at baseline. For the post-schooling employment occupation, the research team converted the originally coded occupation into NOC. The research team also coded the programs of study reported in the student surveys according to the Classification of Instructional Programs 2016 (CIP).

While information captured in surveys can be coded carefully to the respective standard classification systems for Canada, there exists no strong logical link between these standard systems. For example, occupational coding and post-secondary program coding are not linked in a standard way. As a first step to understand the evolution of career aspirations and the relationship to post-secondary choice, therefore, the research team established *empirical* linkage between post-secondary program's CIP codes and the subsequent occupations. In short, the research team used data recorded for the comparison group samples in which they examined the percentage distribution of NOC codes for each CIP code. Then they identified the major NOC codes (ignoring those with a trivial proportion) associated with each CIP code. Researchers coded this association provided there was no obvious inconsistency between the occupation and the post-secondary program's content. Naturally, there are multiple occupations that can be linked to a single program and an occupation can be associated with multiple programs.

With empirical linkage, the outcomes of interest are derived using matches between career aspirations and program of study at different stages of the youth's career path. The following indicators denote the matching:

- A 0-1 indicator of a match between early career aspirations at Grade 8/9 and the intended program of study at any post-secondary education when the student reaches Grade 12: This is a proxy indicator of continuing the early career aspiration.

- A 0-1 indicator of improving career clarity: from unclear early career aspirations at Grade 8/9 to having a specific intended program of study at any post-secondary education by Grade 12.

- A 0-1 indicator of a match between the intended program of study at Grade 12 and the observed program of study at any subsequent post-secondary education level: This is a proxy indicator of carrying out the post-secondary plan.

- A 0-1 indicator of a match between career aspirations at Grade 8/9 and the observed program of study in any type of post-secondary education: This is a proxy indicator of carrying out the early career aspiration.

- A 0-1 indicator of a match between career aspirations at Grade 8/9 to the post-schooling career: This is a proxy indicator of realization of the early career aspiration.

- A 0-1 indicator of a match between the observed program of study in any type of post-secondary education and the post-schooling career: This is a proxy indicator of realization of the career plan through post-secondary education.

The literature review (earlier report) established that at an early age, students have less clarity on their career aspirations as well as less information or knowledge about the program requirements when matching their career aspirations to a program of study. Youth are also often in their career *exploration* stage until age 20. Therefore, we expect career indecision to exist within both the program and comparison groups. However, we hypothesize that career education as added to students' experiences by the FTD and BC AVID interventions will change the pattern for groups with these interventions. By providing additional support or focus, students will be helped in clarifying and realizing their career interests. This should thereby assist them in either (a) switching from their initially unclear career aspirations to a clearer career plan, or (b) maintaining their career aspirations and being able to identify the steps they need to realize their aspirations at an early stage.

LIMITATIONS OF THE ANALYSIS

Although the research team carefully coded career aspirations and program of study into NOC and CIP codes, there is still a potential for error. As stated earlier, while information captured in surveys can be coded carefully to the respective standard classification systems, there is actually no strong logical link between these systems, and therefore any linking system between the two classifications devised by researchers is open to criticism.

This study is exploratory in nature because the data collected have not been designed to examine the detailed evolution of career decisions. The study cannot imply that career education *causes*

the changes in the career pathways as discussed in the findings. The results imply relationships, associations or correlations between career education programs and the resulting career pathways.

Results from this analysis must also be interpreted carefully as career outcomes are subjective. The study does not imply that any particular career pathway or that switching or sticking with particular career aspirations should be interpreted as "good" or "bad".

THE RESULTS OF THE ANALYSIS

HOW DOES CAREER EDUCATION AFFECT CAREER ASPIRATIONS AND THE PATH TO CAREER REALIZATION?

The research team first examined the effect of each of the career education interventions by taking advantage of the experimental design of the FTD and BC AVID projects. The team applied Probit regressions of the six indicators derived in the previous section on eligibility for the EYH and LA interventions (with the FTD sample) to identify the causal effects of the experimentally-offered career education interventions on the career path. The team also applied a Probit regression of the indicator "carrying out the early aspiration" for the BC AVID program with the BC AVID sample. Since, in expectation, there are no statistically observed or unobserved differences between the members of the program and comparison groups in a randomized trial, any difference in the outcome indicators between the program and comparison groups can be reliably attributed to the additional intervention. Tables 1 and 2 present the estimated experimental impacts of career interventions on students' career pathways for the FTD and BC AVID projects, respectively.

Column (1) of Table 1 shows that the early guarantee of a post-secondary grant (LA) decreased the likelihood of students' continuing their early career aspiration from Grade 9 to Grade 12 by 7.9 percentage points on average. Similarly, career education workshops (EYH) also decreased the likelihood that students from lower-income families continued their early career aspirations by 7.2 percentage points. The combination of the two interventions (LA+EYH) also induced lower-income students to switch early career aspiration by 7.2 percentage points. Essentially, the results suggest that career interventions place 7 to 8 per cent of lower-income students on a different career pathway during high school. However, none of the FTD interventions had a statistically significant effect on improving students' career clarity at Grade 12 (Column (2) of Table 1).

On average, students from higher income families who participated in career education workshops were less likely to carry out their post-secondary plan in Grade 12 by 9.4 percentage points (Column (3) of Table 1). However, none of the FTD interventions had a statistically significant effect on carrying out the post-secondary plan among students from lower-income families.

Column (4) on Table 1 shows that, the EYH career education workshops had a statistically significant impact to induce a change of post-secondary program choice relative to early career aspirations by 6.0 percentage points and 4.4 percentage points respectively among students from

lower- and higher-income groups. By contrast, the early guarantee of a post-secondary grant was not associated with changing the post-secondary program choice relative to early career aspirations.

Since the FTD interventions changed students' career planning and steps towards their career goal, it is reasonable to expect them also to change students' actual early career. Column (5) of Table 1 shows that career education workshops lowered the likelihood of realizing early career aspirations on average by 6.1 percentage points and 4.7 percentage points, respectively, for students from lower income and higher income family. These effects are to be expected given career education workshops also decreased the likelihood of carrying out early career aspirations in post-secondary choices by a similar magnitude. Again, in contrast, the early guarantee of a post-secondary grant did not substantively affect the realization of early career aspirations, suggesting that although the offer led to switches in career aspirations during high school these did not manifest in later changes in behaviour, PSE or occupational experiences.

Importantly, almost all career interventions *increased the likelihood of students realising a career matching the PSE program they choose* (Column (6) of Table 1). The positive impact of realising the career plan through PSE is highest among students offered an early guarantee of a post-secondary grant at 14.8 percentage points. The next highest impact of 7.7 percentage points is among students who were offered for the combined interventions, and the offered of the career education workshops had an impact of 6.6 percentage points among lower-income students. Career education interventions appear to ensure more alignment between the choice of post-secondary program and actual career.

The sample of BC AVID allows only the examination of whether participating students carried out their early career aspiration by choosing a matching post-secondary program. Similar to EYH career education workshops, on average, the academic engagement intervention of BC AVID decreased the likelihood of students carrying out their early career aspirations by 10.4 percentage points.

Table 1 Estimates of Future to Discover interventions' impact on career pathways

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Learning Accounts	-0.079*	-0.007	0.004	-0.028	-0.038	0.148***
	(0.043)	(0.033)	(0.049)	(0.030)	(0.032)	(0.043)
Explore Your Horizons (Lower-income)	-0.078*	-0.016	-0.014	-0.060**	-0.061**	0.020
	(0.044)	(0.034)	(0.050)	(0.029)	(0.031)	(0.043)
Explore Your Horizons (Higher-income)	0.003	-0.027	-0.094**	-0.044*	-0.047*	0.066*
	(0.038)	(0.029)	(0.042)	(0.026)	(0.028)	(0.037)
Learning Accounts & Explore Your Horizons	-0.072*	-0.020	-0.029	-0.026	-0.024	0.077*
	(0.043)	(0.033)	(0.050)	(0.031)	(0.033)	(0.044)
Observations	2,007	2,826	1,570	2,857	1,814	2,052

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 2 Estimates of BC AVID's impact on career pathways

	Carrying out the early career aspiration
BC AVID	-0.104**
	(0.052)
Observations	376

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

WHAT ARE SOME POTENTIAL CHANNELS FOR THE INFLUENCE OF CAREER EDUCATION ON STUDENT'S CAREER PATHS?

Besides the impact analysis on the evolution of education choices and post-secondary outcomes, the research team aimed to identify any mediating factors contributing to changes in early career pathways as presented in the preceding section.[5] This section discusses the potential channels by which career education interventions influence decisions through an analysis of mediating factors.

As a first step in the mediating factor analysis, the research team extended the impact analysis model and examined potential baseline and time-varying factors affecting students' career pathways. Such covariates examined include demographic characteristics (gender, disability status, Indigenous status), household demographics, students' situation (school experience, school behaviours, academic engagement, fitting in with school, peer influences, participation in activities, self-esteem, support from others, skills, valuation of PSE, and career exploration activities), exposure to work and volunteering activities. The impact estimates obtained after controlling for these covariates are comparable to the results from the Tables 1 and 2 (please refer to Tables 12 and 13 in Appendix A). Since interventions offered were randomly assigned to students independently of the distribution of these or any other characteristics, the sign and statistical significance of the interventions' impacts with or without covariates are largely the same for the FTD program although statistical significance does differ slightly in the case of BC AVID.

The team then examined how career education affects outcomes while controlling for mediating factors in the regression analysis, to understand the direct and indirect effects of career education. Figure 1 presents a conceptual model of these intermediary effects. The mediating factors selected for the analysis were all affected by one or more career interventions (Table 4). Including some intermediary effects such as students' situation (school behaviours, academic engagement, participation in activities, valuation of PSE, and career exploration activities), exposure to work, and volunteering activities into the estimation model yields some interesting findings.

[5] A mediator analysis examines what factors mediate the relationship between the independent and dependent variables – explaining the reason for such a relationship to exist. In other words, a mediator variable can carry an effect. In a perfect mediation, an independent variable leads to some kind of change to the mediator variable, which then leads to a change in the dependent variable.

Figure 1 Conceptual model of intermediary effects of career education

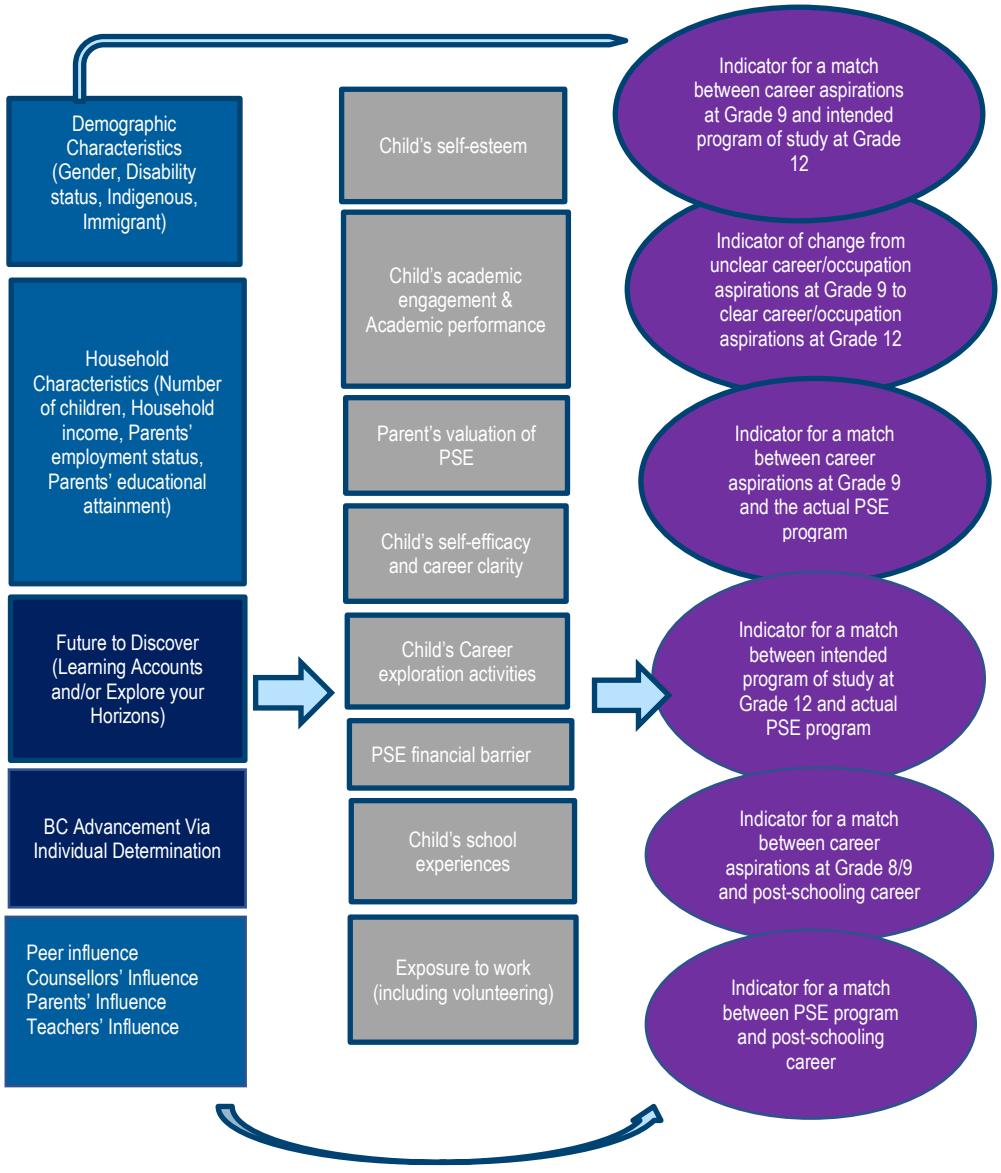

Table 3 Estimated impacts of FTD interventions on mediating factors

Mediating factors for career pathways	Learning Account	Explore Your Horizons (lower-income)	Explore Your Horizons (higher-income)	Learning Accounts & Explore Your Horizons
Average grade at Grade 12	2.453	1.759	10.347***	1.496
Below average number of career activities at Grade 12	-0.154**	0.03	-0.137**	-0.173**
Parent valued PSE	0.352***	-0.024	0.181***	0.329***
Volunteering activities at Grade 12	0.01	0.036	0.143***	0.01
Below average academic engagement at Grade 12	-0.221***	-0.071	-0.082	-0.125*

Notes: Selected regression coefficient estimates of the FTD program interventions are shown in each row of the intermediary outcome factors. Detailed estimates are presented in Tables 14 and 15 of Appendix A. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

First, Column (1) of Table 4 shows that there were not many intermediary effects on continuing early career aspirations. Explore Your Horizons had no direct impact on continuing early career aspirations among students from higher-income families, even though it also had two opposite indirect impacts through mediating factors: average grade and volunteering activities at Grade 12. The indirect effects of FTD interventions on continuing early career aspirations among lower-income students through average school grades were only marginal.

None of the FTD interventions had any direct impact on career clarity. Below-average academic engagement or below-average number of career activities at Grade 12 were both associated with improvement of career clarity (Column (2) of Table 4). A potential explanation for this counter-intuitive result is that career education programs changed students' decision with respect to immediately entering labour market for an easy-to-obtain job among students who initially had the least interest in pursuing a career or further education. This group would try to get a job they knew they could get in Grade 12 in the absence of a career education intervention. The proxy indicator of improvement in career clarity would then be capturing the identification of an occupation rather than of a career among this group. Since the early guarantee of a post-secondary grant and its combination with career education workshops raised academic engagement and career activities, the group of previously disinterested student participants might become less likely to seek an easy-to-obtain job even though they had no more clarity about the future.

Table 4 Estimates of the FTD interventions' impacts on career pathways with controls for intermediary effects (Indicators 1 and 2)

	Continuing the early career aspiration (1)	Improving career clarity (2)
Learning Accounts	-0.083**	-0.005
	(0.042)	(0.033)
Explore Your Horizons (Lower-income)	-0.085*	-0.016
	(0.043)	(0.033)
Explore Your Horizons (Higher-income)	-0.018	-0.023
	(0.038)	(0.029)
Learning Accounts & Explore Your Horizons	-0.068	-0.017
	(0.043)	(0.033)
Average grade >= A at Grade 12 (EYH-HI+)	0.005***	
	(0.001)	
Below average academic engagement at Grade 12 (LA-, LA+EYH-)		0.045**
		(0.018)
Below average number of career activities at Grade 12 (LA-, EYH-, LA+EYH-)		0.065***
		(0.022)
Volunteering activities at Grade 12 (EYH-HI+)	-0.044*	
	(0.024)	
Observations	2,007	2,824

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Volunteering during high school acts as a mediating factor for the association between career education workshops (for youth from higher-income families) and carrying the post secondary plan (Column (3) of Table 5). The result suggests that the increase in students' volunteering activities and career exploration activities might increase doubt among some higher-income participants in EYH with respect to their original plan. The results of EYH on higher-income

participants therefore correspond with the estimated overall impact findings (in Table 1) that EYH for higher-income participants decreased the likelihood of them carrying out the post secondary plan.

The positive effects of parents' valuation of PSE and academic engagement provide two channels for the early guarantee of a post-secondary grant (for those from lower-income families) and career education workshops (for students from higher income families) to increase the likelihood that youth carry out early career aspirations (Column (4) of Table 5). Including the indirect effects in the estimation seems to increase the magnitude of the negative direct effects of both Future to Discover interventions (compared to Table 1).

The early guarantee of a post-secondary grant and career education workshops (for higher income students) increased the number of career activities at Grade 12 and the realization of early career aspirations (Column (5) of Table 5). Nevertheless, the indirect effects were not substantial, and the direct effects were more or less the same as for the overall impacts in Table 1. Similarly, the direct impacts of Future to Discover interventions (Column (6) of Table 5) on realization of the career plan through PSE were in line with the estimated overall impacts (Table 1), even though there were mixed impacts on students' confidence about a future career.

Table 5 Estimates of the FTD interventions' impacts on career pathways that controls for intermediary effects (Indicators 3 to 6)

	Carrying out the post-secondary plan (3)	Carrying out the early career aspiration (4)	Realization of the early career aspiration (5)	Realization of the career plan through PSE (6)
Learning Accounts	0.004	-0.057*	-0.038	0.148***
	(0.049)	(0.030)	(0.032)	(0.043)
Explore Your Horizons (Lower-income)	-0.014	-0.066**	-0.059*	0.020
	(0.050)	(0.029)	(0.031)	(0.043)
Explore Your Horizons (Higher-income)	-0.079*	-0.056**	-0.047*	0.066*
	(0.043)	(0.027)	(0.028)	(0.037)
Learning Accounts & Explore Your Horizons	-0.030	-0.042	-0.025	0.077*
	(0.050)	(0.031)	(0.033)	(0.044)

	Carrying out the post-secondary plan (3)	Carrying out the early career aspiration (4)	Realization of the early career aspiration (5)	Realization of the career plan through PSE (6)
Volunteering activities at Grade 12 (EYH-HI+)	-0.117*** (0.026)			
Parent valued PSE (LA+, EYH-HI+, LA+EYH+)		0.075*** (0.026)		
Below average academic engagement at Grade 12 (LA-, LA+EYH-)		-0.095*** (0.018)		
Below average number of career activities at Grade 12 (LA-, EYH-HI-, LA+EYH-)			-0.039** (0.020)	
Observations	1,570	2,857	1,814	2,052

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

For BC AVID, Table 16 of Appendix A shows that the intervention affected students' academic engagement at Grade 12, but the estimate of impact for this indirect channel for carrying out the early career aspiration (Table 6) was not statistically significant. As a result, the direct impact of BC AVID on carrying out the early career aspiration is a negative 10.2 percentage points, similar to the estimated overall impact of negative 10.4 percentage points in Table 2.

Table 6 Estimates of the BC AVID intervention's impact on career pathways that controls for intermediary effects

	Carrying out the early career aspiration
BC AVID	-0.102** (0.055)
Below average academic engagement at Grade 12 (BC AVID+)	0.080 (0.091)
Observations	376

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

WHAT ARE THE EFFECTS OF COUNSELLORS, PARENTS, AND PEERS ON THE RELATIONSHIP BETWEEN CAREER EDUCATION AND CAREER PATHWAYS?

This section presents the results from Probit estimations including the interactions of career counsellors, parents, and peers in the relationship between career education programs and career pathways. These three groups of people may have an influence on students' formation of career aspirations and career planning. However, it is unclear what role they play when students receive more structured career education interventions. This part of the analysis treats the students' self-reports of different types of interaction with these people as influences on the effect of career education in FTD and BC AVID projects.[6]

Career counsellors

Although the role of career counsellors in students' formation of career aspirations and career action planning has been documented extensively, it is rather difficult to examine career counsellors' effects quantitatively. For example, the needs and knowledge of students who talk to a career counsellor are likely different from those who do not. Therefore, we would not be able to attribute observed differences in career pathways between students who talked to a career counsellor and those who did not as the effects of career counsellors. The differences may reflect the inherent difference of the groups of students who choose to speak with counsellors.[7] However, the data collected for FTD and BC AVID allow researchers to investigate whether career counsellors play a substitute or complementary role in career education programs.

Regardless of the career education intervention in FTD, talking to a career counsellor was associated with a lower likelihood of improving career clarity (by 9.1 percentage points) and carrying out the post-secondary plan (by 13.1 percentage points), while it was associated with a higher likelihood of carrying out the early career aspiration (by 8.3 percentage points). In contrast to the statistically significant marginal effects presented in Table 7, the estimated coefficients of "talking to a career counsellor" or its interaction with the career education interventions were almost all statistically insignificant in the six Probit estimations (Table 17 in

6 Moderation determines whether a third variable influences the strength or direction of the relationship between an independent and dependent variable. The moderator variable might change the strength of a relationship from strong to moderate, to nothing at all.

7 Our preliminary analysis shows that talking to a career counsellor was associated with lower career clarity, lower probability of carrying out the intended post-secondary program, and lower probability of carrying out early career aspirations.

Appendix A). This suggests that career counsellors' effects were at least partially associated with the career education program in Future to Discover.

Talking to a career counsellor (as reported in Grade 12) did not seem to change much of the impacts of FTD interventions on students' career pathways (Table 7). The only exception is the interaction effect of talking to a counsellor with the LA offer on carrying out the early career aspiration. While the effect of the early guarantee of a post-secondary grant in general was to decrease the likelihood that students stay on track and carry out their early career aspiration, the combination of the early guarantee *and* talking to the career counsellor helped with staying on track.

For BC AVID, talking to a career counsellor or teacher (as reported in the 66-month survey, some time after high school graduation) did not influence how BC AVID affected carrying out early career aspirations (Table 8). The results suggest that career counsellors are not a substantial substitute nor supplement to the academic engagement intervention.

Parents

Parents influence children's career development in multiple ways. Parents' career may serve as a model pathway for their children, and their in-depth knowledge and connections may serve as resources to support their children's choices. Parents' supports may also be important to students since there is a lot of uncertainty in the career decision-making process. Parental preference may affect their children's career choices.

There is evidence that engagement with parents affect students' career development (Table 7): students who reported talking to parents when they had questions or were wondering about what to do after high school had a higher likelihood of continuing their early career aspiration (by 5.9 percentage points) and carrying out the early career aspiration (by 3.5 percentage points). In addition, students offered the additional career education who talked to parents were less likely to carry out their post-secondary plan (by 4.0 percentage points). This effect is the result of a complex interaction with the FTD intervention, because talking to parents in the absence of the career education intervention increased the likelihood of carrying out the post-secondary plan (Table 17 of Appendix A).

Students who received an early guarantee of a grant and talked to parents were less likely to continue their early career aspirations or to carry out their post-secondary plan. This result suggests that lower-income students who learn early that PSE has become more affordable (regardless of whether they were offered EYH workshops) may benefit from engaging parents to support changing their career choices through PSE. There is also evidence in Table 7 that the effects of EYH workshops on students in terms of switching from their early career aspiration or changing their post-secondary plan were larger among those who talked with parents. Parents'

roles seemed to diminish once students entered PSE or the labour market. The evidence is consistent with the notion that parents' support is crucial to the decision-making process of students during the formative, late high school period of their career development.

The smaller sample from BC AVID does not provide conclusive evidence that talking to family or friends has a direct or indirect effect on carrying out the early career aspiration (Table 8), though the directions of the estimated effects are similar to those obtained for FTD.

Peers

Students who have friends with a positive view to PSE might adopt a similar path due to peer effects. The sharing of career information among friends may also affect the choice of post-secondary programs and eventual occupations. Career education programs' effects on PSE could be reinforced by peer support. FTD collected information on the views of participating students' friends. Table 7 includes the results of our examination of the effects of having peers with a positive view of PSE.

The presence of PSE-positive peers is associated with a lower likelihood of a student carrying out the post-secondary plan (by 4.9 percentage points) but a higher likelihood of carrying out the early career aspiration (by 3.5 percentage points). A closer examination of the estimated coefficients (Table 17) suggests that those with PSE-positive peers might have had a better idea what they wanted to do since Grade 9.

Having PSE-positive peers enhanced the positive effects of the early guarantee of a post-secondary grant as well as the EYH workshops on improving career clarity for those who did not have high clarity of career aspirations in Grade 9. Those who had PSE-positive peers and participated in the EYH workshops had a lower likelihood (between 19.5 and 24.4 percentage points) of carrying out the post-secondary plan, suggesting the importance of peer influences on finalizing the career education-informed post-secondary choice.

Table 7 The role of parents, peers, and counsellors in the relationship between FTD programs and career pathways

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Learning Account	-0.085**	-0.007	-0.005	-0.062*	-0.038	0.144***
	(0.043)	(0.033)	(0.049)	(0.033)	(0.033)	(0.044)
Explore Your Horizons (Lower-income)	-0.077*	-0.016	-0.020	-0.083***	-0.065**	0.008
	(0.044)	(0.034)	(0.050)	(0.032)	(0.032)	(0.044)
Explore Your Horizons (Higher-income)	-0.003	-0.027	-0.090**	-0.070**	-0.046	0.047
	(0.038)	(0.029)	(0.042)	(0.029)	(0.029)	(0.039)
Learning Accounts & Explore Your Horizons	-0.075*	-0.024	-0.031	-0.053	-0.020	0.073
	(0.043)	(0.033)	(0.050)	(0.034)	(0.034)	(0.045)
Talk to career counsellor	-0.012	-0.091***	-0.131**	0.083***	-0.031	-0.045
	(0.045)	(0.035)	(0.052)	(0.025)	(0.034)	(0.044)
Talk to parents	0.059**	-0.033	-0.040*	0.037**	-0.008	0.006
	(0.025)	(0.019)	(0.028)	(0.018)	(0.018)	(0.025)
Positive peers	-0.006	0.004	-0.049*	0.035*	0.019	0.038
	(0.024)	(0.019)	(0.028)	(0.018)	(0.018)	(0.025)
Learning Accounts x Talk to career counsellor	-0.192	0.212	0.208	0.149*	-0.056	-0.283
	(0.175)	(0.132)	(0.230)	(0.088)	(0.146)	(0.180)
Explore Your Horizons (Lower-income) x Talk to career counsellor	-0.024	-0.101	-0.071	0.074	-0.087	-0.082
	(0.200)	(0.148)	(0.203)	(0.092)	(0.149)	(0.184)
Explore Your Horizons (Higher-income) x Talk to career counsellor	0.197	-0.025	-0.227	0.014	0.041	-0.118
	(0.163)	(0.127)	(0.170)	(0.092)	(0.115)	(0.153)

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Explore Your Horizons & Learning Accounts x Talk to career counsellor	-0.121	0.005	-0.051	0.108	0.009	-0.151
	(0.174)	(0.133)	(0.188)	(0.097)	(0.132)	(0.184)
Learning Accounts x Talk to parents	-0.230**	-0.025	-0.211**	-0.079	-0.011	-0.111
	(0.092)	(0.071)	(0.105)	(0.069)	(0.072)	(0.094)
Explore Your Horizons (Lower-income) x Talk to parents	-0.161*	0.181	-0.248**	-0.102	0.010	-0.142
	(0.093)	(0.070)	(0.110)	(0.069)	(0.067)	(0.095)
Explore Your Horizons (Higher-income) x Talk to parents	-0.181***	-0.067	-0.104	0.012	0.011	-0.074
	(0.084)	(0.065)	(0.094)	(0.060)	(0.063)	(0.084)
Learning Accounts & Explore Your Horizons x Talk to parents	-0.145	-0.002	-0.310***	-0.028	-0.053	-0.118
	(0.092)	(0.071)	(0.108)	(0.070)	(0.076)	(0.096)
Learning Accounts x Positive peers	0.035	0.181**	0.055	-0.099	-0.056	0.055
	(0.092)	(0.070)	(0.111)	(0.068)	(0.067)	(0.096)
Explore Your Horizons (Lower-income) x Positive peers	0.087	0.133*	-0.195*	-0.043	-0.060	-0.117
	(0.096)	(0.073)	(0.108)	(0.065)	(0.066)	(0.100)
Explore Your Horizons (Higher-income) x Positive peers	-0.011	0.094	-0.244***	-0.099	-0.029	0.000
	(0.083)	(0.065)	(0.093)	(0.060)	(0.059)	(0.085)
Explore Your Horizons & Learning Accounts x Positive peers	0.085	0.096	-0.081	-0.064	-0.055	-0.049
	(0.093)	(0.072)	(0.109)	(0.069)	(0.071)	(0.097)
Observations	2006	2825	1569	2566	1722	1969

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 8 The effect of family, friends, and counsellors in the relationship between the BC AVID program and career pathways

Effect	Carrying out the early career aspiration
BC AVID	-0.121**
	(0.050)
Talk to a counsellor/teacher	0.093
	(0.067)
Talk to family and friends	0.148
	(0.092)
BC AVID x Talk to a counsellor/teacher	0.031
	(0.132)
BC AVID x Talk to family and friends	0.009
	(0.195)
Observations	361

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

HOW DOES SOCIOECONOMIC STATUS AFFECT THE IMPACTS OF CAREER EDUCATION ON STUDENTS' CAREER PATHWAYS?

Different sub-populations may respond differently to career education. For instance, students with a lower socioeconomic status may start with less clarity in career aspirations or less often have plans than their counterparts from families with higher socioeconomic status. Career education may disproportionately help students with a lower socioeconomic status clarify their career plan (and thereby result in more changes to their intended program of study at Grade 12 relative to their intent at Grade 8/9) compared to students with a higher socioeconomic status.

This section focuses on the impacts of different socioeconomic backgrounds. The research team analyzed the effects of FTD interventions on career pathways for students for whom neither parent had education beyond high school separately from those whose parents had post-secondary experience (results presented in Tables 9 and 10). The research team analyzed the impacts of BC AVID by family-income levels (Table 11).

Among students for whom neither parent had education beyond high school, an early guarantee of a grant led to switching their early career aspirations as early as Grade 12 by 18.1 percentage points (Column (1) of Table 9). This is a much larger impact than the insignificant 1.9 percentage point impact among students with post-secondary-educated parents (Column (1) of Table 10). However, EYH workshops and the combination of LA+EYH have similar impacts regardless of parents' educational attainment, (the estimates are not statistically significant due to the splitting of the sample size).

Similarly, Column (4) of Tables 9 and Table 10 show that EYH workshops' impacts on carrying out early career aspirations were larger among students with lower-educated parents. The offer of EYH workshops decreased the likelihood of carrying out the early career aspiration by 6.5 to 11.0 percentage points on average among students with lower-educated parents.

The early guarantee of a post-secondary grant had a larger impact, reducing the likelihood of realizing early career aspirations, among students with post-secondary-educated parents (at 9.2 percentage points) than among their counterparts with lower-educated parents (Column (5) of Tables 9 and 10). Other than this difference, the impacts of differences in parental educational attainment for EYH workshops and LA+EYH are similar in magnitude.

Finally, the early guarantee of a post-secondary grant had a positive impact on the likelihood of realizing the career plan through PSE (Column (6) of Tables 9 and 10) regardless of parental educational attainment. However, the impact is slightly larger among students with lower-educated parents (at 17.0 percentage points) compared to those with post-secondary-educated parents (at 12.6 percentage points). The positive impacts of EYH workshops on students from higher income families are also concentrated among those with lower-educated parents (at 9.6 percentage points).

In summary, FTD interventions had mostly larger impacts on career pathways among students with lower-educated parents than those with post-secondary-educated parents. The only exception is the larger impact of the early guarantee of a post-secondary grant on the realization of early career aspirations among students with post-secondary-educated parents.

Table 9 The impacts of FTD programs on career pathways among students whose parents had a high school or less education

	Continuing the early career aspiration (1)	Improving career clarity (2)	Carrying out the post-secondary plan (3)	Carrying out the early career aspiration (4)	Realization of the early career aspiration (5)	Realization of the career plan through PSE (6)
Learning Accounts	-0.181***	0.003	0.036	-0.046	0.016	0.170***
	(0.060)	(0.047)	(0.070)	(0.045)	(0.046)	(0.059)
Explore Your Horizons (Lower-income)	-0.095	0.010	0.022	-0.110***	-0.067	-0.002
	(0.065)	(0.050)	(0.072)	(0.043)	(0.041)	(0.060)
Explore Your Horizons (Higher-income)	-0.029	-0.004	-0.058	-0.065*	-0.040	0.096*
	(0.051)	(0.040)	(0.056)	(0.037)	(0.036)	(0.049)
Learning Accounts & Explore Your Horizons	-0.061	-0.034	0.025	-0.044	-0.017	0.082
	(0.061)	(0.047)	(0.069)	(0.047)	(0.044)	(0.062)
Observations	1,178	1,657	993	1,653	1,059	1,275

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 10 The impacts of FTD programs on career pathways among students whose parents had a post-secondary education

	Continuing the early career aspiration (1)	Improving career clarity (2)	Carrying out the post-secondary plan (3)	Carrying out the early career aspiration (4)	Realization of the early career aspiration (5)	Realization of the career plan through PSE (6)
Learning Accounts	0.019	-0.015	-0.029	-0.015	-0.092**	0.126**
	(0.060)	(0.046)	(0.068)	(0.041)	(0.043)	(0.062)
Explore Your Horizons (Lower-income)	-0.059	-0.037	-0.052	-0.019	-0.060	0.042
	(0.059)	(0.045)	(0.070)	(0.039)	(0.045)	(0.062)
Explore Your Horizons (Higher-income)	0.012	-0.064	-0.082	-0.040	-0.035	0.018
	(0.061)	(0.046)	(0.069)	(0.039)	(0.046)	(0.060)
Learning Accounts & Explore Your Horizons	-0.089	-0.007	-0.082	-0.011	-0.030	0.072
	(0.060)	(0.047)	(0.072)	(0.041)	(0.048)	(0.062)
Observations	829	1,169	577	1,204	755	777

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

The estimated effects of the BC AVID intervention on switching early career aspirations for students from lower-income families and higher-income families are not statistically significant (Table 11). These statistically insignificant results could be attributed to the small sample sizes for the subgroups.

Table 11 The impacts of BC AVID program on career pathways by household income level

	Carrying out the early career aspiration (Lower income households)	Carrying out the early career aspiration (Higher income households)
BC AVID	-0.104	-0.105
	(0.111)	(0.065)
Observations	87	238

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

OVERVIEW OF THE FINDINGS

In general, the information conveyed by an early guarantee of a post-secondary grant (Learning Accounts from FTD) decreased the likelihood of students continuing with their early (Grade 9) career aspirations through Grade 12 by 7 to 8 percentage points. Enhanced career education workshops (Explore Your Horizons from FTD) reduced the percentage of students carrying out their post-secondary plan (by 9 percentage points among higher-income students) as well as fulfilling the early career aspiration (by 4 to 6 percentage points). An academic engagement program (BC AVID) also reduced the likelihood of carryout the early career aspiration by 10+ percentage points.

Subsequently, students offered enhanced career education (EYH) workshops were less likely to realize their early career aspirations (by 5 to 6 percentage points), suggesting EYH brought about a major change in choices during their late high school years. The early guarantee of a post-secondary grant and EYH workshops improved the likelihood of lower-income students realizing their career plan (as stated at Grade 12) through PSE.

In summary, FTD interventions had larger impacts on career pathways among students with lower-educated parents than those with post-secondary educated parents. The only exception was the larger impact of the early guarantee of a post-secondary grant on the realization of early career aspirations among students with post-secondary-educated parents.

The mechanisms by which these interventions change the choices and pathways turned out to be rather complicated. Our analysis found some interesting explanations using the analysis sample of the FTD Pilot Project. It seems possible that the interventions realigned students' focus, choices, and plans for one subset while reinforcing the choices and plans among those who already had plans involving PSE.

The impacts of offering the early guarantee of a post-secondary grant and EYH workshops on switching away from early career aspirations are direct among lower-income students, while there is evidence that EYH workshops induced higher-income students to change from their early career aspirations because they increased volunteering activities.

The career education interventions increased the number of career activities, which appeared to delay some disinterested students from entering the labour market via easy-to-obtain jobs straight after high school.

Higher-income students were more likely to have a post-secondary plan. This may be because EYH workshops increased their volunteering. This pattern is not evident among lower-income

students offered EYH workshops. However, the EYH workshops decreased the likelihood of carrying out the postsecondary plan among higher income students who increased volunteering activities in Grade 12.

Both the early guarantee of a post-secondary grant and EYH workshops increase the likelihood of carrying out early career aspirations indirectly through increased parent's valuation of PSE and increased academic engagement. The interventions decreased the likelihood of carrying out early career aspirations directly suggesting that for some the career program reinforced their plans while for others it changed their focus and choices.

The study also found evidence of career teachers/counsellors, parents, and peers affecting the impacts of career education. Talking to a career counsellor did not seem to change much the impacts of FTD interventions on students' career pathways, though the combination of the early guarantee of a post-secondary grant and talking to the career counsellor helped students stay on track to carry out their early career aspiration. Engagement with parents was associated with a higher likelihood of continuing and carrying out early career aspirations, though lower-income students offered a Learning Account appeared to need to engage their parents in order to change their career choices through PSE. Parents' role seemed to diminish once students entered PSE or the labour market. Finally, peers with a positive view of PSE influenced how students offered career education finalized their post-secondary choices.

CONCLUSIONS

This exploratory study found evidence to support the notion that career education in high school changes students' career choices and pathways. However, the results are very complex so it may help to characterize them with some general unifying conclusions. With so many findings, it is important to draw out some generalities even when this is at the risk of dropping some qualifications or exceptions made clear in the report. Our initial assessment draws out the following broad conclusions on the patterns seen and their plausible explanations:

- The LA early guarantee of a post-secondary grant and EYH offer of career education workshops appeared to directly impact lower-income students, switching them away from their early career aspirations. Perhaps challenging some assumptions in the literature, career education is especially influential for students from lower-income families.

- There is evidence that the effect of EYH workshops for students from higher-income families was more often indirect, inducing them to increase volunteering activities. Among this group, more tended to change career paths as an effect of the volunteering. This pattern was not evident among lower-income students offered the same workshops.

- Career education interventions typically increased the number of other career-related activities students engaged in, which appeared in turn to delay some disinterested students from entering the labour market via easy-to-obtain jobs straight after high school.

- The EYH career education workshops altered the proportions of students from higher-income families experiencing mediating factors (participation in more 'other' career activities, high parental valuation of PSE and increased volunteering) but had no effect on the prevalence of these experiences for students from lower-income families. However, LA did change these experiences (and increased academic engagement) when offered on its own or in combination with LA. This suggests that such students are unlikely to additionally engage in career-related responses (behaviours and activities) available to them unless they are guaranteed the financial barrier to PSE is going to be addressed. This is an important policy point. That said, EYH alone did have *direct* impacts on career pathway outcomes (continuing the early career aspiration; improving career clarity; carrying out the postsecondary plan) just not via the analyzed potential mediating factors.

- Relatedly, the findings are consistent with career interventions realigning students' early focus, choices, and plans more often for those whose parents had not attended PSE (whose children typically are less likely to access PSE) while doing more to reinforce the existing

early choices and plans among those whose parents had attended PSE (who are typically reported as better able to promote PSE as a destination to their children).

- Notably, the interventions decreased the likelihood that students from lower-income households carried out their early career aspirations directly suggesting that career programming is more effective changing the focus and choices of youth with more disadvantaged backgrounds.

- Both the LA early guarantee of a post-secondary grant and EYH career education workshops increased parents' valuation of PSE (the EYH career education workshops included a component targeting parents, but LA did not). Interventions including LA and BC AVID increased students' academic engagement. These changes in turn influence outcomes such as career clarity, and whether youth carry out their early career aspirations. 'Having parents who value PSE' and 'increasing academic engagement' are associated with an increased likelihood of carrying out the early career aspiration. At the same time, increasing academic engagement reduces career clarity, perhaps due to increasing the range of attainable PSE options.

The study also found evidence of career teachers/counsellors, parents, and peers influencing the impacts of career education. Talking to a career counsellor did not seem to change much the impacts of FTD interventions on students' career pathways, though the combination of the LA early guarantee of a post-secondary grant and talking to the career counsellor helped students stay on track to carry out their early career aspiration. Engagement with parents was associated with a higher likelihood of continuing and carrying out early career aspirations, though lower-income students offered the LA grant appeared more often to need to engage their parents in order to change their career choices through PSE. Parents' role seemed to diminish once students entered PSE or the labour market. Finally, peers with a positive view of PSE influenced how students offered career education finalized their post-secondary choices.

RECOMMENDATIONS

We are reporting a complicated set of findings from a very rich dataset, made richer as a result of CERIC supporting extensive new coding of occupational data. The scale of the project to date reflects the available timeline and budget, and also limitations placed by COVID-19 on access to Statistics Canada Research Data Centres through much of 2020. No analysis has been possible yet using information on students' linked tax records. While a large set of findings that sheds important light on poorly understood yet critical stage of youth career-decision making has been generated, much more needs to be done.

ADDING MEANING TO THE OUTCOMES

The analysis of FTD and BC AVID data has focused on the factors influencing the career decisions of high school students: what changes the direction of career pathways and for whom. We have found what types of intervention can be effective and examined differences for some subgroups, including mediating factors. But the project has not ascribed any particular value to the changes in career pathways. This reflects what can be undertaken with the data so far accessible and coded. But policy makers and practitioners who would like to change youths' decision making are typically seeking to do so with a purpose. There are many different possible purposes, for example:

- to improve life chances of the youth involved (health, wellbeing, earnings);
- to improve the functioning of the labour market or economy, including minimizing disruption in future, adult career transitions;
- to reduce the time spent out of work or NEET, underemployed, or in occupations where their skills are misaligned with the tasks they must perform.

In other words, it will be helpful to align youth long-term outcomes to meet some pre-defined set of needs so as to add meaning to the way career education influences the pathways chosen. Then it could be possible to use the same data to determine factors associated with better meeting those pre-defined needs and (ultimately) recommend changes in career programming to better meet the needs.

There is already the prospect to look at longer career trajectories and many years of earnings data for each FTD project participant. The data are already linkable to tax records through to the point where youth reach age 24 years. Permission can be sought for ongoing linkage indefinitely,

which would permit analysis (in 2020-21) of tax records covering to at least 28 years. The same application could cover linkage to physical and mental health records that over time can add to understanding of the wellbeing of youth who follow particular pathways, and the influence of career interventions on a wider range of wellbeing measures.

More simply, occupational outcomes might be ascribed values in relation to labour market demand, average earnings, or levels of occupational satisfaction. We recommend pursuing as many of these steps as possible in future analysis to help ascribe more meaning to the outcomes reported here.

SUPPORTING CAREER EDUCATION FOR LOWER-INCOME STUDENTS

This exploratory study found evidence to support the notion that career education in high school changes students' career choices and pathways. While the full consequences of different career pathway decisions will await the above recommended work or equivalent new studies, it is already apparent that there is a disparity between socio-economic groups. Students with a lower socioeconomic status start with less clarity in career aspirations or less often have firm career plans than their counterparts from families with higher socioeconomic status. Perhaps encouragingly, career education interventions seem disproportionately to help those without postsecondary-educated parents and from lower-income families clarify their career plan (and thereby result in more changes for these youths to their intended program of study at Grade 12 relative to their intent at Grade 8/9) compared to students with a higher socioeconomic status.

The reliance of more disadvantaged youth on support directly provided to them from the education system (rather than behaviours and supports they must seek out and initiate) may warrant a reconsideration of how services are structured and the types of support provided. Previous studies using this same FTD dataset have shown how youth from lower-income families are strongly influenced by career education and early guarantees of student aid (Hui & Ford, 2018). It seems relevant to recommend making appropriate versions of such career supports available more universally to support all students who might miss out on other sources of career development support. Moreover, given youth may be disproportionately supported by the education system in this respect, care in the design of such supports and investigation of the appropriateness of the outcomes they lead to is advised.

RAISING THE PROFILE OF LONGITUDINAL RESEARCH ON CAREER DECISIONS

Career decision making is, by definition, a long-term endeavour of critical importance to the life chances of individuals and the functioning of economies. It is perhaps surprising that there has been relatively low recent investment in data that can help youth, those who advise and support them and policy makers, understand the consequences of those decisions and the environments that support the most optimal outcomes. Critical pieces of Canada's data infrastructure are missing:

- there is no official concordance between the classification of instructional programs and the national occupational classification;
- the last national longitudinal survey of youth transitions was collected over a decade ago;
- for only one province can independent researchers currently link K-12 school records to postsecondary education and labour market data.

The literature review considered the cost to society of the collectivity of career indecision and mismatch to the labour market. From the current research and other literature, it is clear career interventions are having an effect on changing choices and outcomes. Not investing in learning how career decisions are made (and can be made better) seems imprudent. We recommend harnessing findings such as those from this study into knowledge mobilization efforts with a view to improving the infrastructure for longitudinal data analysis on Canadians' career pathways.

MOVING FORWARD

Career decision-making is a complex process with many inputs and outcomes. Many studies break the process down to simplify the analysis and presentation of findings. By starting with a comprehensive literature review and using two rich longitudinal data sets with four experimental treatments spanning ten years of young Canadians' lives, this project has learned a great deal about the many influences at work and their consequences by taking a different approach. One price has been that it has proven difficult to simplify and summarize the findings.

To move forward, the authors need to continue their work to make more sense of the findings. At the risk of further complication, the work cannot proceed with considering critical further dimensions influencing decisions and career education access such as gender and linguistic heritage. As well, we should explore application of the data analysis approach used here to new datasets (or participate actively in their creation) to be able to embrace Indigenous and racialized dimensions of career decision making.

The authors will continue these early efforts to mobilize the knowledge already gained, to increase its relevance to practitioners and its utility to decision makers. By presenting the work in different forums and formats we hope to gain peer advice and insights that will improve the usefulness of the findings. Vitally, young people themselves need to be engaged in interpreting findings, shaping future analysis, and co-designing new career interventions to test. We also hope other analysts will be motivated to use FTD data – publicly available in Statistics Canada Research Data Centres – and other newly linked longitudinal data, to explore outstanding questions on youth career development.

This study is using secondary data analysis – the data were generated for an original purpose set in 2003 that is different from the knowledge needs of the 2020s going forward. The workplan moving forward from this exploratory study includes:

- Developing proposals to continue this study that will support additional data analysis, including applications to Statistics Canada to link additional youth outcomes from tax records and improve the meaning of the findings obtained here.
- Proposing and running new studies specifically to test the hypotheses being generated, to incorporate the impact of online high school career interventions such as Xello and myBlueprint, and other recent rapid improvements in labour market information that has become more mainstream over the period since FTD and BC AVID began.

- Projecting the results onto the labour market and educational realities of the 2020s, to ensure further recommendations are relevant to an era transformed by the consequences of the COVID-19 pandemic, automation and artificial intelligence, other influences on labour market precarity, new online learning as well as diversity and inclusion.

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APPENDIX A: SUPPLEMENTARY ANALYSIS TABLES

Table 12 Estimates of Future to Discover interventions' impacts on career pathways with controls for covariates

	Continuing the early career aspiration (1)	Improving career clarity (2)	Carrying out the post-secondary plan (3)	Carrying out the early career aspiration (4)	Realization of the early career aspiration (5)	Realization of the career plan through PSE (6)
Learning account	-0.081*	0.005	0.016	-0.061*	-0.036	0.135***
	(0.042)	(0.032)	(0.049)	(0.032)	(0.029)	(0.043)
Explore Your Horizons (Low income)	-0.072*	0.006	-0.005	-0.086***	-0.052*	0.017
	(0.043)	(0.033)	(0.050)	(0.031)	(0.029)	(0.043)
Explore Your Horizons (High income)	-0.100*	-0.064	-0.015	-0.113***	-0.011	0.063
	(0.052)	(0.040)	(0.063)	(0.040)	(0.039)	(0.055)
Learning account + Explore Your Horizons	-0.051	-0.013	-0.001	-0.050	-0.014	0.060
	(0.042)	(0.032)	(0.050)	(0.033)	(0.031)	(0.044)
Female student	0.115***	-0.030*	-0.025	0.043**	0.035**	-0.043*
	(0.024)	(0.017)	(0.027)	(0.017)	(0.017)	(0.023)
With disability	-0.009	-0.005	-0.002	-0.046	0.002	0.007
	(0.044)	(0.032)	(0.060)	(0.034)	(0.033)	(0.050)
Indigenous	0.003	-0.002	0.095	-0.133***	-0.012	0.000
	(0.057)	(0.042)	(0.069)	(0.044)	(0.043)	(0.063)
Number of children in the family at baseline	-0.003	-0.013	-0.020	-0.012	0.002	-0.008
	(0.013)	(0.010)	(0.016)	(0.010)	(0.010)	(0.014)

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Signing parent was working at baseline	-0.027	0.008	0.004	-0.002	-0.003	-0.002
	(0.029)	(0.021)	(0.033)	(0.021)	(0.021)	(0.030)
Signing parent's age	0.001	0.002	-0.002	0.000	-0.000	-0.001
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Family income – Less than or equal 20,000	-0.141**	-0.051	0.036	-0.038	0.008	0.036
	(0.058)	(0.043)	(0.071)	(0.043)	(0.042)	(0.061)
Family income – Greater than 20,000 to 40,000	-0.131**	-0.044	0.001	-0.060	0.032	-0.023
	(0.054)	(0.040)	(0.064)	(0.040)	(0.039)	(0.056)
Family income – Greater than 40,000 to 60,000	-0.094**	-0.026	0.055	-0.042	0.041	0.021
	(0.045)	(0.034)	(0.052)	(0.033)	(0.032)	(0.045)
Family income – Greater than 60,000 to 80,000	-0.015	-0.005	-0.004	0.018	0.029	0.022
	(0.036)	(0.027)	(0.040)	(0.025)	(0.026)	(0.034)
Parent education – high school or less	-0.019	-0.012	0.052*	0.010	0.018	0.010
	(0.024)	(0.017)	(0.028)	(0.017)	(0.017)	(0.024)
Student's average grade – A or better	0.026	0.005	-0.063**	0.017	-0.005	-0.044*
	(0.026)	(0.019)	(0.029)	(0.018)	(0.018)	(0.025)
Student school experience-perceived value is below average	-0.011	-0.007	-0.005	-0.014	0.002	0.031
	(0.028)	(0.020)	(0.032)	(0.020)	(0.020)	(0.028)
Student school experience-relationship with teachers is below average	0.014	-0.027	-0.009	0.013	0.005	-0.044*
	(0.026)	(0.019)	(0.030)	(0.018)	(0.019)	(0.025)

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Student school experience-relationship with schoolmates is below average	-0.002	-0.012	-0.023	-0.014	-0.010	0.019
	(0.027)	(0.019)	(0.031)	(0.019)	(0.019)	(0.026)
Student school experience-peacefulness below average	-0.029	0.010	-0.005	-0.003	0.020	-0.016
	(0.027)	(0.020)	(0.032)	(0.019)	(0.019)	(0.028)
Academic engagement – below average	-0.018	0.033	0.030	-0.045**	-0.002	0.032
	(0.029)	(0.020)	(0.033)	(0.020)	(0.021)	(0.029)
Socially fitting in at school – below average	0.055**	-0.070***	0.042	0.044**	0.021	-0.026
	(0.026)	(0.019)	(0.030)	(0.019)	(0.019)	(0.026)
Participation in school activities	-0.061**	-0.048**	-0.027	-0.056**	-0.029	-0.030
	(0.030)	(0.023)	(0.034)	(0.023)	(0.023)	(0.030)
Participation in outside school activities	0.010	0.015	0.011	0.042**	0.019	0.008
	(0.029)	(0.022)	(0.033)	(0.021)	(0.021)	(0.028)
Talk to parents – below average	-0.020	0.023	0.094***	-0.007	0.000	-0.048*
	(0.026)	(0.018)	(0.029)	(0.018)	(0.018)	(0.025)
Good friend – below average	-0.014	-0.020	0.030	-0.011	-0.000	-0.004
	(0.024)	(0.018)	(0.028)	(0.017)	(0.018)	(0.024)
Volunteering activities	0.014	-0.017	0.006	0.014	-0.023	-0.035
	(0.025)	(0.018)	(0.028)	(0.017)	(0.018)	(0.024)
Ever worked	-0.009	-0.011	-0.066	0.069**	0.059	0.040
	(0.052)	(0.036)	(0.055)	(0.033)	(0.038)	(0.052)
Self esteem – below average	-0.010	0.001	-0.057*	-0.006	-0.014	0.019
	(0.027)	(0.020)	(0.031)	(0.019)	(0.020)	(0.027)

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Index of usage of various skills – below average	0.021	0.025	0.005	0.012	0.039**	0.027
	(0.024)	(0.017)	(0.027)	(0.017)	(0.017)	(0.023)
Index of usage of various job search skills – below average	-0.004	0.007	0.006	0.007	0.001	-0.002
	(0.024)	(0.017)	(0.027)	(0.017)	(0.017)	(0.023)
Number of career activities – below average	0.033	0.057***	-0.012	-0.007	0.014	0.012
	(0.026)	(0.019)	(0.030)	(0.019)	(0.019)	(0.026)
Self efficacy – below average	-0.014	0.003	0.022	-0.058***	0.015	-0.021
	(0.028)	(0.020)	(0.032)	(0.019)	(0.020)	(0.027)
Career clarity – below average	-0.017	0.230***	0.029	-0.068***	-0.011	0.019
	(0.025)	(0.018)	(0.029)	(0.018)	(0.018)	(0.026)
Career counsellor	0.009	-0.060***	0.030	0.038**	0.010	-0.026
	(0.026)	(0.020)	(0.030)	(0.019)	(0.019)	(0.027)
Observations	2,005	2,825	1,568	2,794	1,813	2,051

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 13 Estimates of BC AVID's impacts on career pathways with controls for covariates

	Carrying out the early career aspiration
BC AVID	-0.097*
	(0.052)
Female student	0.223***
	(0.056)
Indigenous	0.096
	(0.101)
Family income – Less than or equal 20,000	0.009
	(0.122)
Family income – Greater than 20,000 to 40,000	0.071
	(0.080)
Family income – Greater than 40,000 to 60,000	-0.038
	(0.082)
Family income – Greater than 60,000 to 80,000	0.062
	(0.079)
Parent's value of PSE at baseline	0.107
	(0.084)
Student school experience: Below average perceived value	-0.102
	(0.062)
Student school experience: Below average relationship with teachers	0.059
	(0.059)
Student school experience: Below average relationship with schoolmates	-0.001
	(0.058)
Student school experience: Below average school peacefulness	-0.110**
	(0.055)
Below average academic engagement	0.001
	(0.060)

	Carrying out the early career aspiration
Below average fitting in socially at school	0.016
	(0.058)
Participation in school activities	-0.050
	(0.069)
Participation in outside school activities	0.071
	(0.054)
Below average frequency of talking to parents	-0.090
	(0.058)
Below average number of good friend	0.045
	(0.058)
Full attendance to class	0.184
	(0.235)
Volunteering activities	0.110
	(0.083)
Below average self-esteem	0.000
	(0.052)
Below average usage of various job search skills	0.025
	(0.053)
Below average number of career activities	0.051
	(0.063)
Below average self-efficacy	0.088
	(0.060)
Below average career clarity	-0.105**
	(0.053)
Observations	374

Notes: Average marginal effects of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 14 Estimates of Future to Discover interventions' impacts on career pathways mediating variables (set 1)

	Average grade at Grade 12	Below average number of career activities at Grade 12	Parent valued PSE
	(1)	(2)	(3)
Learning Account	2.453	-0.154**	0.352***
	(1.553)	(0.072)	(0.075)
Explore Your Horizons (low income)	1.759	0.030	-0.024
	(1.481)	(0.068)	(0.069)
Explore Your Horizons (high income)	10.347***	-0.137**	0.181***
	(1.342)	(0.062)	(0.063)
Learning Accounts & Explore Your Horizons	1.496	-0.173**	0.329***
	(1.554)	(0.072)	(0.075)
Constant	56.194***	-0.292***	0.385***
	(1.000)	(0.046)	(0.046)
Observations	4,635	4,635	4,616

Notes: Probit was applied for each binary dependent variable. OLS was applied for each scale or numeric dependent variable. Empty cells represent dropped independent variables due to collinearity or invalid predictors. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 15 Estimates of Future to Discover interventions' impacts on career pathways mediating variables (set 2)

	Volunteering activities at Grade 12 (1)	Below average academic engagement at Grade 12 (2)	Idea about the future (at Grade 12 survey) (3)	Confident about future career (at 66-month survey) (4)
Learning Account	0.010	-0.221***	-0.027	0.249**
	(0.029)	(0.073)	(0.130)	(0.118)
Explore Your Horizons (low income)	0.036	-0.071	-0.045	0.005
	(0.029)	(0.069)	(0.134)	(0.118)
Explore Your Horizons (high income)	0.143***	-0.082	-0.235**	-0.207**
	(0.026)	(0.062)	(0.113)	(0.099)
Learning Accounts & Explore Your Horizons	0.010	-0.125*	0.052	0.246**
	(0.030)	(0.072)	(0.134)	(0.120)
Constant	0.508***	-0.349***	1.142***	0.750***
	(0.019)	(0.046)	(0.092)	(0.080)
Observations	3,956	4,635	2,323	2,317

Notes: Probit was applied for each binary dependent variable. OLS was applied for each scale or numeric dependent variable. Empty cells represent dropped independent variables due to collinearity or invalid predictors. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 16 Estimates of BC AVID's impact on career pathways mediating variables

	Below average academic engagement at Grade 12
BC AVID	0.047***
	(0.021)
Constant	3.148***
	(0.0169)
Observations	1063

Notes: OLS was applied for each scale or numeric dependent variable. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 17 The moderating of parents, peers, and counsellors on the relationship between the BC AVID program and career pathways – Probit coefficients

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Learning Account	0.589	-0.909**	-0.232	-0.638	0.248	1.195**
	(0.474)	(0.418)	(0.648)	(0.545)	(0.563)	(0.546)
Explore Your Horizons (Lower-income)	-0.002	0.01	0.951	-0.353	0.183	0.737
	(0.522)	(0.388)	(0.582)	(0.416)	(0.570)	(0.539)
Explore Your Horizons (Higher-income)	-0.145	-0.055	0.995*	-0.149	-0.353	0.574
	(0.464)	(0.354)	(0.526)	(0.358)	(0.534)	(0.461)
Learning Accounts & Explore Your Horizons	0.207	-0.255	0.763	-0.47	0.213	0.892*
	(0.469)	(0.368)	(0.540)	(0.467)	(0.560)	(0.534)
Talk to career counsellor	0.112	-0.293	-0.12	0.146	-0.097	0.253
	(0.336)	(0.260)	(0.343)	(0.245)	(0.370)	(0.361)
Talk to parents	0.497***	0.014	0.341*	0.236	0.032	0.237
	(0.162)	(0.139)	(0.184)	(0.156)	(0.208)	(0.175)
Positive peers	-0.074	-0.230*	0.112	0.344**	0.274	0.109
	(0.168)	(0.140)	(0.185)	(0.155)	(0.211)	(0.178)
Learning Accounts x Talk to career counsellor	-0.487	0.617	0.532	0.883*	-0.238	-0.758
	(0.450)	(0.397)	(0.601)	(0.524)	(0.539)	(0.520)
Explore Your Horizons (Lower-income) x Talk to career counsellor	-0.062	-0.264	-0.191	0.403	-0.402	-0.23
	(0.509)	(0.380)	(0.548)	(0.402)	(0.551)	(0.514)
Explore Your Horizons (Higher-income) x Talk to career counsellor	0.509	-0.074	-0.617	0.084	0.18	-0.322
	(0.431)	(0.330)	(0.478)	(0.329)	(0.494)	(0.430)

	Continuing the early career aspiration	Improving career clarity	Carrying out the post-secondary plan	Carrying out the early career aspiration	Realization of the early career aspiration	Realization of the career plan through PSE
	(1)	(2)	(3)	(4)	(5)	(6)
Explore Your Horizons & Learning Accounts x Talk to career counsellor	-0.308	0.006	-0.134	0.522	0.028	-0.406
	(0.443)	(0.349)	(0.498)	(0.447)	(0.519)	(0.499)
Learning Accounts x Talk to parents	-0.582**	-0.072	-0.537**	-0.245	-0.045	-0.298
	(0.235)	(0.204)	(0.271)	(0.231)	(0.321)	(0.249)
Explore Your Horizons (Lower-income) x Talk to parents	-0.409*	-0.11	-0.634**	-0.331	0.071	-0.381
	(0.238)	(0.207)	(0.284)	(0.233)	(0.336)	(0.255)
Explore Your Horizons (Higher-income) x Talk to parents	-0.457**	-0.196	-0.261	0.088	0.064	-0.202
	(0.215)	(0.186)	(0.242)	(0.211)	(0.288)	(0.226)
Learning Accounts & Explore Your Horizons x Talk to parents	-0.368	-0.004	-0.793***	-0.07	-0.224	-0.316
	(0.236)	(0.206)	(0.283)	(0.238)	(0.310)	(0.252)
Learning Accounts x Positive peers	0.09	0.523**	0.139	-0.309	-0.232	0.133
	(0.236)	(0.205)	(0.282)	(0.231)	(0.317)	(0.254)
Explore Your Horizons (Lower-income) x Positive peers	0.223	0.381*	-0.505*	-0.089	-0.247	-0.308
	(0.246)	(0.212)	(0.283)	(0.238)	(0.344)	(0.263)
Explore Your Horizons (Higher-income) x Positive peers	-0.026	0.264	-0.628***	-0.305	-0.09	-0.005
	(0.216)	(0.185)	(0.241)	(0.204)	(0.289)	(0.226)
Explore Your Horizons & Learning Accounts x Positive peers	0.218	0.269	-0.207	-0.186	-0.234	-0.131
	(0.239)	(0.206)	(0.279)	(0.236)	(0.317)	(0.255)
Constant	-0.29	-0.074	-0.058	-1.131***	-1.101***	-0.826**
	(0.361)	(0.272)	(0.380)	(0.262)	(0.392)	(0.380)
Observations	2,006	2,825	1,569	2,566	1,722	1,969

Notes: Estimated coefficients of Probit models are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 18 The moderating of parents, peers, and counsellors on the relationship between the BC AVID program and career pathways – Probit coefficients

	Carrying out the early career aspiration
BC AVID	-0.397
	(0.522)
Talk to a counsellor	0.192
	(0.246)
BC AVID x Talk to a counsellor	0.076
	(0.339)
Talk to family and friends	0.362
	(0.401)
BC AVID x Talk to family and friends	-0.028
	(0.502)
Constant	-0.208
	(0.395)
Observations	361

Notes: Estimated coefficients of Probit model are shown. Standard errors are in parentheses. Asterisks denote statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

OTTAWA

55 Murray Street, Suite 400
Ottawa, Ontario
K1N 5M3

VANCOUVER

789 West Pender Street, Suite 440
Vancouver, British Columbia
V6C 1H2

CALGARY

MONTREAL

4126 Saint-Denis Street, Suite 302
Montreal, Quebec
H2W 2M5

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