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Are Mental Health and Neurodevelopmental Conditions Barriers to Postsecondary Access?

by Rubab Arim and Marc Frenette

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Analytical Studies Branch Research Paper Series

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Abstract

The Canadian literature on postsecondary access has identified many of its key determinants including parental education and income, academic performance, and sex. However, relatively little work has investigated the independent role of disability in postsecondary enrollment. This study fills that gap by estimating the relationship between mental health and neurodevelopmental conditions diagnosed in childhood (available from the National Longitudinal Survey of Children and Youth [NLSCY]) and postsecondary enrollment during early adulthood (available from the tax credits on the T1 Family File [T1FF]). The study is possible as a result of the recent linkage between the NLSCY and T1FF.

The findings suggest that 77% of youth who were not diagnosed with any long-term health condition in their school years (the comparison group) enrolled in postsecondary education (PSE) by their early 20s. In contrast, 60% of youth diagnosed with a neurodevelopmental condition (NDC) enrolled in PSE in the same time frame (a gap of 17 percentage points), while only 48% of youth diagnosed with a mental health condition (MHC) enrolled in PSE (a gap of 29 percentage points compared with youth in the comparison group). Youth diagnosed with both an NDC and an MHC were even less likely to enroll, with only 36% going on to PSE (41 percentage points behind youth in the comparison group). Differences in sex, academic performance and family background (e.g., parental income and education) explain only about one-third of these gaps.

Among the MHCs, the most common diagnosis was Attention Deficit Hyperactivity Disorder (ADHD). Youth with an ADHD diagnosis were less likely to pursue PSE than youth diagnosed with other types of MHCs such as emotional, psychological or nervous difficulties. These findings suggest that youth diagnosed with NDCs and MHCs in their school years face barriers to enrolling in PSE that are distinct from those confronting other youth.

Executive summary

The benefits of obtaining a postsecondary education (PSE) are well documented. Various factors such as sex, academic performance, and parental education and income have been identified as key determinants of enrollment in PSE. Yet, relatively little attention has been paid to the independent role of disability as a barrier to enrolling in PSE.

The purpose of this study is to address this gap by comparing the postsecondary enrollment rates of youth aged 18 to 22 who fell under one of four categories during their school years:

- had no long-term diagnosed health condition including neurodevelopmental, mental health and other conditions (comparison group)
- had a neurodevelopmental condition (NDC)
- had a mental health condition (MHC)
- had both an NDC and an MHC.

The health conditions were captured in the National Longitudinal Survey of Children and Youth (NLSCY), which was linked to the T1 Family File (T1FF). The T1FF contains information on tuition credits and education and textbook amounts, both of which help identify postsecondary enrollment.

The findings show that 77% of youth in the comparison group enrolled in PSE by their early 20s. In contrast, 60% of youth diagnosed with an NDC enrolled in PSE in the same time frame (a gap of 17 percentage points), while only 48% of youth diagnosed with an MHC enrolled in postsecondary (a gap of 29 percentage points compared with youth in the comparison group). Youth diagnosed with both an NDC and an MHC were even less likely to enroll: only 36% went on to PSE (41 percentage points behind youth in the comparison group). Differences in sex, academic performance and family background (e.g., parental income and education) explain only about one-third of these gaps.

Among the MHCs, the most common diagnosis was Attention Deficit Hyperactivity Disorder (ADHD). Youth with an ADHD diagnosis were less likely to pursue PSE than youth diagnosed with other types of MHCs such as emotional, psychological or nervous difficulties. Youth who had even moderate levels of hyperactivity or inattention were considerably less likely to enroll in PSE than youth in the comparison group.

While causal relationships cannot be inferred in this study, the findings suggest that youth diagnosed with NDCs and MHCs in their school years face barriers to enrolling in PSE that are distinct from those confronting other youth.

One important issue not addressed in the current study is the extent to which students with an NDC or MHC progress through college or university. Whether online learning facilitates progression for students with disabilities in the postsecondary system is a useful avenue of future research.

1 Introduction

The benefits of obtaining a postsecondary education (PSE) are well documented. Findings consistently suggest that PSE can have a positive impact on various life outcomes, including better employment, greater job satisfaction, higher earnings, elevated social status, increased civic engagement, healthier lifestyle and improved life satisfaction (Ma, Pender and Welch 2016; Frenette 2014; Oreopoulos and Petronijevic 2013; Gilmore and Bose 2005; Tagayuna et al. 2005).

Many factors have been identified as key determinants of PSE enrollment, including academic performance, parental education and income, and sex (Frenette 2007; Frenette and Zeman 2007). Yet, relatively little attention has been paid to the independent role of disability as a barrier to PSE. The challenges students with disabilities may face in furthering their education may be distinct from those faced by the general population.

In the 2012 Canadian Survey on Disability, 14% of Canadians aged 25 to 64 with disabilities reported having at least a university qualification, compared with 27% of those without disabilities. The figure was 18% among Canadians aged 25 to 44 with disabilities (Arim 2017). American research suggests that students with Attention Deficit Hyperactivity Disorder (ADHD)¹ or learning disabilities are less likely to finish PSE compared with their peers (NCES n.d.). Similarly, students with emotional disorders (a form of mental health condition [MHC]) are less likely to enroll in PSE (Fleming and Fairweather 2012; Wagner et al. 2005).

To improve this situation, the Canadian government has made several changes in the Canada Student Loans Program (CSLP) over the years. Currently, eligible students may receive the Canada Student Grant for Students with Permanent Disabilities, valued at \$2,000 per loan year, or the Canada Student Grant for Services and Equipment for Students with Permanent Disabilities, valued at up to \$8,000 per loan year. Eligible students may also qualify for repayment assistance through the Repayment Assistance Plan for Borrowers with a Permanent Disability or for loan forgiveness through the CSLP's Severe Permanent Disability Benefit. Students with permanent disabilities are also eligible to enroll in reduced course loads while continuing to maintain full-time student status. Various measures have also been implemented by the provinces.

The objective of this study is to estimate the role of MHCs and neurodevelopmental conditions (NDCs) in determining enrollment in PSE. Specifically, the study compares the postsecondary enrollment rates of youth aged 18 to 22 who fell under one of four categories during their school years:

- had no long-term diagnosed health condition including neurodevelopmental, mental health and other conditions (comparison group)
- had an NDC
- had an MHC
- had both an NDC and an MHC.

The health conditions were captured in the National Longitudinal Survey of Children and Youth (NLSCY), which was linked to the T1 Family File (T1FF). The T1FF contains information on tuition credits and education and textbook amounts, both of which are used to identify postsecondary enrollment. Importantly, the NLSCY contains all of the key determinants of access to PSE (e.g., parental education and income, academic performance, sex).

1. ADHD is characterized by inattention, hyperactivity and impulsivity (APA 2013).

Section 2 discusses the data and methods used in the study. Section 3 describes the results. The study concludes with a summary and discussion of the results.

2 Data and methodology

The study is based on the NLSCY data linked to the T1FF. The NLSCY was a longitudinal study of the development and well-being of Canadians from birth to early adulthood. The survey began in 1994 and continued every two years until 2009. The original sample in Cycle 1 (1994-1995) consisted of youth aged 0 to 11 who were followed until they reached age 25 in Cycle 8 (2008-2009). The sample excluded youth living on Indian reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces, and residents of some remote regions. The person most knowledgeable (referred to as the parent hereafter) was the biological mother for 90% of participant youth and responded to the child and adult component questions.

T1FF data are collected primarily from income tax returns submitted to the Canada Revenue Agency to provide income and demographic information for geographic areas. The data cover all individuals who complete an income tax return (T1 return) for a reference calendar year or who received the Canada Child Tax Benefit (CCTB). In addition, non-filing spouses or partners, non-filing children, and filing children who reported the same address as their parent are identified from three sources (the CCTB file, the births files and a historical file) and added to the T1FF. When complete, the T1FF data represent approximately 95% of the population.

The NLSCY data that were used for the linkage were drawn from the Cycle 4 sample, because this was the earliest available sample for linkage. However, they included only longitudinal respondents from Cycle 1. Specifically, the data from the original sample of participant children (aged 0 to 11) in Cycle 1 (1994-1995) who were aged 6 to 17 and responded to the survey in Cycle 4 (2000-2001)² were linked to the 1993-to-2015 T1FF. All files were linked probabilistically using information such as date of birth, sex, names (surnames and given names), postal code, census subdivision, city and province. Overall, 97% of the target population in the NLSCY (youth aged 6 to 17 in Cycle 4) was linked to the T1FF.

The purpose of this analytical study is to compare enrollment in PSE between youth who were not diagnosed with any long-term health condition in their school years (comparison group)³ and those who were diagnosed with an NDC or an MHC. Neurodevelopmental disorders are congenital or acquired impairments of the brain and central nervous system. They create difficulties in movement, cognition, hearing and vision, communication, emotion, and behaviour (Morris et al. 2013). In total, four NDCs are considered: epilepsy, cerebral palsy, intellectual disability⁴ and learning disability. The MHCs considered in this study include ADHD⁵ and emotional, psychological or nervous difficulties. These MHCs have neurodevelopmental underpinnings, but they are classified in a separate category in this study, since the needs of those with MHCs may differ from those with other NDCs. PSE enrollment was compared between youth who were not diagnosed with any long-

2. Compared with youth who withdrew from the NLSCY, youth who responded to the survey in Cycle 4, on average, were younger, obtained lower mathematics scores, had parents with higher education and higher aspirations for higher education for the youth, and lived in households with higher income and fewer people. Importantly, these differences were small in magnitude. The results are available from the authors upon request.

3. We refrained from labelling this group as “healthy” because some of these youth may have been diagnosed with a long-term health condition (e.g., schizophrenia, bipolar disorder) in late adolescence or early 20s.

4. This condition was labelled as “mental handicap” in Cycle 4 of the NLSCY.

5. In the English version of the questionnaire for Cycle 4 of the NLSCY, this condition was labelled as “attention deficit disorder” (the distinction for hyperactivity was not made). However, in the French questionnaire of the same cycle, the condition was labelled as “déficit de la capacité d’attention avec hyperactivité” (attention deficit disorder with hyperactivity). After Cycle 4, both versions of the questionnaire labelled the condition as “attention deficit disorder (with or without hyperactivity)”. This adjustment was not associated with a change in the relative proportion of French and English respondents who reported their child as having been diagnosed with the condition. In fact, these proportions were the same for respondents of both questionnaires, before and after the adjustment.

term health condition in their school years (comparison group) and those who were diagnosed with an NDC, MHC or both in their school years. These long-term diagnosed conditions were asked of youth aged 6 to 15 in the target population.

The mathematics test (a computation exercise) was used as an indicator of the youth's academic performance and was administered to youth in Grade 2 or above, aged 7 to 15. This restriction governed the choice of the target analytical sample, which included youth who were aged 7 to 15 in Cycle 4 (2000-2001) of the NLSCY. Of these youth, 2,752 were out of scope because they were diagnosed with a long-term health condition other than an NDC or an MHC (e.g., heart disease) and therefore could not be classified under the comparison group of youth who were considered to be "healthy" in their school years. The initial analytical sample included 7,007 youth. However, some youth could not be linked, had missing information on long-term health conditions or had missing tax information at some point. After these cases were dropped, the final analytical sample comprised 5,222 youth who were not diagnosed with any long-term health condition or were diagnosed with an NDC or MHC⁶ from ages 7 to 15 and were followed from the time they were 18 to 19 until they were 21 to 22 in the tax data.⁷ Although most students enroll in PSE right after high school graduation, Mamiseishvili and Koch (2012) found that 53% of students with disabilities delayed enrollment. Examining PSE enrollment as late as age 21 to 22 accommodates this trend.

The classification of youth's health consisted of four groupings:

- (a) youth in the comparison group (who were not diagnosed with any long-term health condition in their school years)
- (b) youth who had an NDC only (including epilepsy, cerebral palsy, intellectual disability and learning disability)
- (c) youth who had an MHC only (including ADHD and emotional, psychological or nervous difficulties)
- (d) youth with both an NDC and an MHC.

A majority (86%) of youth with an NDC had a learning disability, whereas 71% of youth with an MHC had ADHD. Eight variables were used as covariates in this study, all of which were taken from Cycle 4 of the NLSCY data:

- youth's sex
- youth's age
- youth's mathematics score
- parents' highest educational attainment
- household income
- household size
- parental aspiration for highest education for the youth⁸
- province of residence.

6. Youth diagnosed with an NDC or an MHC may also have had other long-term health conditions.

7. Compared with the youth who were excluded from the final analytical sample, the youth who were kept were more likely to be female and to have NDCs as well as MHCs. Youth who were kept in the sample were also, on average, younger and lived in a household with higher income and more people. Again, these differences were generally small in magnitude. The results are available from the authors upon request.

8. Although parental aspiration may very well have an impact on their child's educational choices, it may also be endogenous to the child's abilities. Therefore, this variable was considered only in the final model for enrollment in PSE by age 21 to 22 as a type of robustness test.

The main outcome of interest was enrollment in PSE and was determined in the T1FF data according to reported tuition fees or other amounts spent on education or textbooks. See Frenette (2017) for a detailed discussion on the validity of this approach. See Appendix Table 1 for a more detailed description of all study variables.

Ordinary least squares regression analyses⁹ were used to compare the PSE enrollment of youth in the comparison group with that of those who were diagnosed with an NDC, an MHC or both, after the effects of covariates were accounted for. All analyses were weighted using the NLSCY Cycle 4 cross-sectional weight¹⁰ to represent the population at the time of data collection (i.e., January 2001) and bootstrapped to account for complex survey design (Rust and Rao 1996).

3 Results

Youth with a diagnosed NDC or MHC were considerably less likely to enroll in PSE (Table 1). Specifically, 77% of youth in the comparison group enrolled in PSE by age 21 to 22. In contrast, 60% of youth diagnosed with an NDC enrolled in PSE in the same time frame (a gap of 17 percentage points), while only 48% of youth diagnosed with an MHC enrolled in PSE (a gap of 29 percentage points compared with youth in the comparison group). Youth diagnosed with both an NDC and an MHC were even less likely to enroll: only 36% enrolled in PSE (41 percentage points behind youth in the comparison group). As youth aged, the gap in enrollment declined for youth with an NDC but increased for youth with an MHC. Both groups registered considerable increases in their probability of ever enrolling in PSE over the period; however, the improvement is larger among youth with an NDC (in absolute terms, as well as relative to the comparison group). The unadjusted gaps are shown in Chart 1.

9. Probit and logit regression models were also estimated and yielded nearly identical results. These results are not included in this paper; however, they are available from the authors upon request.

10. Because of the high linkage rates and no significant bias in the linked results, reweighting of the survey weights was not performed for the linked NLSCY and T1FF data.

Table 1
Descriptive statistics of the variables in the study

	Total	Comparison	NDC	MHC	Both
Youth characteristics					
Female (percent)	52.17	53.92	43.18 *	30.13 ***	F
Age in school years (mean)	10.87	10.81	11.42 *	11.40 **	11.11
Mathematics score (mean)	2.54	2.59	1.96 ***	2.10 ***	1.63 ***
Parent characteristics					
At least one parent completed postsecondary education (percent)	51.54	51.98	46.16	48.18	48.90
Aspiration for university education for the youth (percent)	71.68	74.39	35.23 ***	56.68 **	43.99 ^E ***
Family characteristics					
Household income ≥ \$50,000 (percent)	62.22	63.09	59.52	54.33	41.22 ^E **
Household size (mean)	3.33	3.34	3.29	3.07 **	3.06
Main outcome variable					
Enrollment in postsecondary education (percent)					
By age 18 to 19	58.51	61.37	38.12 ***	35.86 ***	F
By age 19 to 20	68.11	70.74	49.32 **	44.79 ***	28.13 ***
By age 20 to 21	72.30	75.01	54.99 **	45.26 ***	33.15 ***
By age 21 to 22	74.32	76.85	60.22 **	47.68 ***	36.01 ***
Observations (n)	5,222	4,749	193	199	81
Proportion of sample (percent)	100	90	4	4	2

^E use with caution

F too unreliable to be published (for the female variable n < 30; for the enrollment by age 18 to 19 variable n < 15)

* significantly different from reference category (p < 0.05)

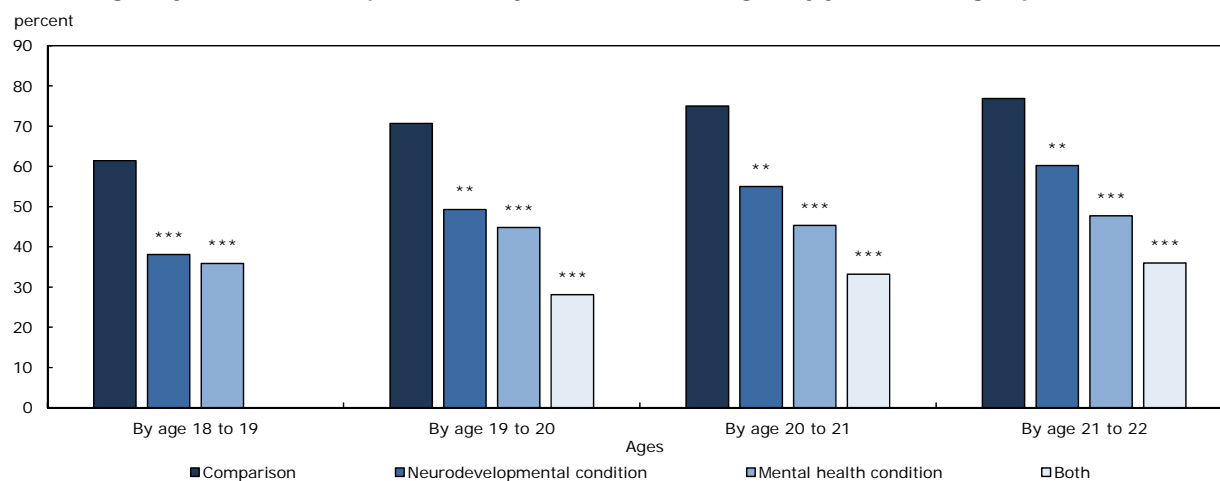
** significantly different from reference category (p < 0.01)

*** significantly different from reference category (p < 0.001)

Notes: The comparison group is the reference group in all comparisons. NDC: neurodevelopmental condition; MHC: mental health condition.

Sources: Statistics Canada, National Longitudinal Survey of Children and Youth (2000-2001) and T1 Family File (2004 to 2015) linked data.

Chart 1
Percentage of youth enrolled in postsecondary education across ages, by youth health group



** significantly different from reference category (p < 0.01)

*** significantly different from reference category (p < 0.001)

Note: The percentage of youth enrolled in postsecondary education by age 18 to 19 with both conditions is not presented because the estimate is too unreliable to be published (n < 15).

Source: Statistics Canada, National Longitudinal Survey of Children and Youth (2000-2001) and T1 Family File (2004 to 2015) linked data.

Various factors may explain these trends. In Table 1, descriptive statistics of several determinants of access to PSE are also shown. Compared with youth in the comparison group, those with an NDC or MHC:

- were considerably less likely to be female
- were somewhat older

- scored lower on the mathematics test
- were less likely to have a parent who aspired for the youth to attend PSE
- had lower household income
- lived in somewhat smaller households.

Table 2 shows the regression results separately by four age groups, after all the covariates shown in Table 1 were accounted for.¹¹ For youth with an NDC, the gap by age 18 to 19 declined to 16 percentage points (from 23 percentage points in the raw data) after differences in youth sex, age, academic performance and family background were accounted for. In addition, this gap further decreased to 11 percentage points by age 21 to 22. Importantly, when parental aspiration for the youth's education was taken into consideration, the gap further decreased to 4 percentage points by age 21 to 22, and this difference was not statistically significant.

11. Additional regression models including interaction effects between sex and health conditions were also run. Results were not reported because none of the interaction effects were statistically significant.

Table 2
Predicting enrollment in postsecondary education by age 18 to 19 through 21 to 22—regression results

	By age 18 to 19		By age 19 to 20		By age 20 to 21		By age 21 to 22		By age 21 to 22 ¹	
	regression coefficient	standard error	regression coefficient	standard error	regression coefficient	standard error	regression coefficient	standard error	regression coefficient	standard error
Intercept	0.09	0.08	0.12	0.07	0.20 **	0.07	0.24 ***	0.07	0.03	0.08
Youth health										
With neurodevelopmental conditions	-0.16 **	0.05	-0.15 **	0.05	-0.14 **	0.05	-0.11 *	0.05	-0.04	0.04
With mental health conditions	-0.15 ***	0.04	-0.16 ***	0.04	-0.21 ***	0.04	-0.21 ***	0.05	-0.21 ***	0.05
Both	-0.39 ***	0.04	-0.28 ***	0.07	-0.28 ***	0.07	-0.28 ***	0.07	-0.24 ***	0.07
Youth sex										
Female youth	0.13 ***	0.02	0.09 ***	0.02	0.08 ***	0.02	0.08 ***	0.02	0.08 ***	0.02
Youth age in school years	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Number of correct math scores (reference: 0 to 5)										
6 to 9	0.09 **	0.03	0.10 **	0.03	0.09 **	0.03	0.09 **	0.03	0.07 **	0.03
10 to 13	0.17 ***	0.03	0.17 ***	0.03	0.13 ***	0.03	0.12 ***	0.03	0.10 ***	0.03
14 to 20	0.25 ***	0.04	0.24 ***	0.03	0.20 ***	0.03	0.19 ***	0.03	0.16 ***	0.03
Missing	0.07 *	0.03	0.07 *	0.03	0.05	0.03	0.03	0.03	0.03	0.03
Parental education (reference: less than secondary school graduation)										
Secondary school graduation	0.11 *	0.05	0.18 ***	0.05	0.12 *	0.05	0.13 *	0.05	0.11 *	0.05
Other beyond high school, some trade school, some community college, some university, etc.	0.21 ***	0.05	0.26 ***	0.05	0.21 ***	0.05	0.21 ***	0.05	0.18 ***	0.05
Diploma/certificate from trade school	0.20 ***	0.05	0.24 ***	0.05	0.19 ***	0.05	0.20 ***	0.05	0.17 ***	0.05
Diploma/certificate from community college	0.23 ***	0.05	0.29 ***	0.05	0.25 ***	0.05	0.25 ***	0.05	0.21 ***	0.05
Bachelor's degree (includes bachelor of laws)	0.35 ***	0.05	0.38 ***	0.05	0.33 ***	0.05	0.32 ***	0.05	0.27 ***	0.05
Master's, degree in medicine, doctorate	0.39 ***	0.06	0.43 ***	0.05	0.36 ***	0.05	0.36 ***	0.05	0.30 ***	0.05
Unknown	0.28	0.14	0.47 **	0.15	0.39 **	0.15	0.37 *	0.15	0.35 **	0.13
Household income (reference: less than \$30,000)										
\$30,000 to \$39,999	0.08	0.04	0.05	0.05	0.07	0.05	0.06	0.05	0.07	0.05
\$40,000 to \$49,999	0.12 **	0.04	0.12 **	0.04	0.16 ***	0.04	0.15 ***	0.04	0.16 ***	0.04
\$50,000 to \$59,999	0.13 **	0.04	0.15 ***	0.04	0.18 ***	0.04	0.16 ***	0.04	0.16 ***	0.04
\$60,000 to \$79,999	0.14 ***	0.04	0.17 ***	0.04	0.19 ***	0.04	0.18 ***	0.04	0.18 ***	0.04
\$80,000 or more	0.21 ***	0.04	0.23 ***	0.04	0.24 ***	0.04	0.23 ***	0.04	0.22 ***	0.04
Household size	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01
Parental aspiration for youth education (reference: primary or elementary school and secondary or high school)										
Community college, CEGEP or nursing school	...	...	...	...	...	...	...	...	0.18 ***	0.04
Trade, technical or vocational school, or business college	...	...	...	...	...	...	...	...	0.19 ***	0.05
University	...	...	...	...	...	...	...	...	0.24 ***	0.04
Other or unknown	...	...	...	...	...	...	...	...	0.14 **	0.06
Province (reference: Ontario)										
Newfoundland and Labrador	0.00	0.04	0.01	0.04	0.01	0.04	0.03	0.04	0.03	0.04
Prince Edward Island	-0.09	0.05	-0.05	0.04	-0.06	0.04	-0.03	0.04	-0.03	0.04
Nova Scotia	0.03	0.04	0.02	0.04	0.03	0.04	0.04	0.04	0.03	0.04
New Brunswick	-0.05	0.04	-0.05	0.04	-0.05	0.04	-0.01	0.04	0.00	0.04
Quebec	-0.03	0.03	-0.01	0.03	-0.01	0.03	0.00	0.03	0.02	0.03
Manitoba	-0.08 *	0.04	-0.06	0.04	-0.04	0.03	-0.04	0.03	-0.03	0.03
Saskatchewan	-0.11 **	0.03	-0.11 **	0.04	-0.08 *	0.03	-0.03	0.03	-0.02	0.03
Alberta	-0.17 ***	0.03	-0.14 ***	0.03	-0.12 ***	0.03	-0.09 **	0.03	-0.08 ***	0.03
British Columbia	-0.09 *	0.03	-0.10 **	0.03	-0.10 **	0.03	-0.10 **	0.03	-0.09 **	0.03

... not applicable

* significantly different from reference category (p < 0.05)

** significantly different from reference category (p < 0.01)

*** significantly different from reference category (p < 0.001)

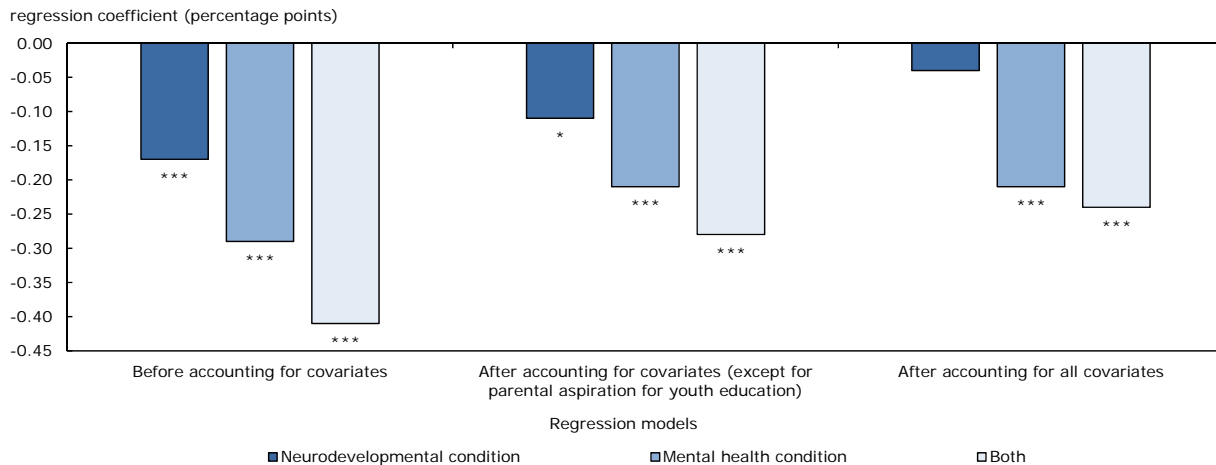
1. The model includes parental aspiration for youth education.

Sources: Statistics Canada, National Longitudinal Survey of Children and Youth (2000-2001) and T1 Family File (2004 to 2015) linked data.

For youth with an MHC, the gap by age 18 to 19 declined to 15 percentage points (from 26 percentage points in the raw data) after all the covariates were accounted for. However, the gap increased to 21 percentage points by age 21 to 22. When parental aspiration for the youth's education was taken into consideration, the gap remained at 21 percentage points by age 21 to 22.

Among the smaller proportion of youth with both an NDC and an MHC, the gap in postsecondary enrollment (relative to youth in the comparison group) was larger than in the case of the other two diagnosed groups. Their probability of enrolling in PSE by age 18 to 19 was 39 percentage points behind that of youth in the comparison group, after all the covariates were adjusted for. The gap eventually declined to 28 percentage points by age 21 to 22. The gap falls only somewhat (to 24 percentage points) after the parental aspiration measure is included in the model. The regression coefficients related to the group indicators can be interpreted as adjusted gaps, and these are shown in Chart 2.

Chart 2
Youth health coefficients from regressions on postsecondary education enrollment by age 21 to 22, before and after accounting for youth, parent and family covariates



* significantly different from reference category ($p < 0.05$)

*** significantly different from reference category ($p < 0.001$)

Source: Statistics Canada, National Longitudinal Survey of Children and Youth (2000-2001) and T1 Family File (2004 to 2015) linked data.

The main set of results is those in the model without parental aspiration by age 21 to 22. Youth with an NDC or an MHC were substantially less likely to enroll in PSE compared with youth in the comparison group, even after differences in sex, academic performance and family background were accounted for. This suggests that youth with diagnosed health conditions, regardless of the type considered here, may face barriers to attending PSE that are distinct from those challenging the general population of youth. Youth with an MHC appear to be the most disadvantaged on this front. Although the difference in predicted enrollment rates between youth with an NDC and youth with an MHC is not quite statistically significant, youth with both types of conditions are significantly less likely to attend PSE by age 21 to 22 than youth with only an NDC. This suggests that MHCs may place additional barriers to accessing PSE on youth who are already dealing with an NDC and possibly other chronic conditions.

Why this is the case is not clear. The addition of the variables in the models explained only about one-third of the unadjusted gap in postsecondary enrollment. This was true for all three groups of diagnosed youth including those with an MHC. This suggests that something else not captured by the variables in the models may be responsible for the lower enrollment rates of youth with an MHC. Perhaps the very nature of MHCs can provide some candidate explanations (see CADDAC 2015; MacKean 2011). In some cases, the condition may render attending school challenging. For example, children with social anxiety may not feel comfortable in a classroom with dozens of peers. Youth with ADHD may not be able to sit still or pay attention in a classroom. Depression may prevent some youth from getting out of bed. Also, these youth may not have received proper support in their school years to gain acceptance into a PSE program. If any of these circumstances prevail, then pursuing optional postsecondary schooling may not be a feasible choice for some youth dealing with MHCs.

Further analysis also demonstrated that among MHCs, ADHD was the most prevalent. In fact, 71% of youth with an MHC were diagnosed with ADHD. In contrast, only 33%¹² of youth with an MHC were diagnosed with emotional, psychological or nervous difficulties. Moreover, the relationship between ADHD and postsecondary enrollment was larger than the relationship between emotional, psychological or nervous difficulties and postsecondary enrollment. Indeed, when the MHC indicator was further categorized by ADHD and emotional, psychological or nervous difficulty indicators in the main regression model (PSE enrollment by age 21 to 22 without the parental aspiration variable), the adjusted gap for youth with ADHD was 26 percentage points, compared with only 10 percentage points for youth with emotional, psychological or nervous difficulties.¹³ Moreover, the coefficient associated with emotional, psychological or nervous difficulties was not statistically significant at 10% ($p=0.21$). ADHD is the most prevalent, long-term diagnosed MHC in school years, and it poses the largest barrier to attending PSE in this sample.

Mental health may also be treated as a continuum, as opposed to a dichotomous diagnosis. For example, many children may feel somewhat hyperactive or inattentive (e.g., showing some symptoms of ADHD) without necessarily being diagnosed with ADHD. This too may hinder one's chances of pursuing PSE. The NLSCY can shed light on this issue because it contains a self-reported Hyperactivity – Inattention scale for youth aged 10 to 15, with a response scale ranging from 0 to 14.¹⁴ Several dummy variables were created to capture the following ranges of the scales: 0 (reference), 1 or 2, 3 or 4, 5 or 6, and 7 to 14. These variables were included in a postsecondary enrollment model similar to the ones shown above.

The results suggest that the relationship between the probability of enrolling in PSE and the Hyperactivity – Inattention scale is monotonic (i.e., increasingly negative with higher scale values). For example, the predicted gap in enrollment between those reporting 7 to 14 and those reporting no hyperactivity or inattention (the reference category of 0) was 14 percentage points. The gap fell to 13 percentage points for those reporting 5 or 6 and to 8 percentage points for those reporting 3 or 4. All of these gaps were statistically significant at 5%. The fact that even moderate amounts of hyperactivity or inattention (e.g., 3 or 4 out of a scale of 14) are associated with a significant disadvantage in postsecondary enrollment is an important consideration. Most youth do not have a clinical diagnosis, and therefore may not be targeted for help (by their parents, teachers, government or themselves). Indeed, very few of those reporting a 3 or 4 on the scale had a diagnosis of ADHD.¹⁵ The results were not statistically significant for the Anxiety and Emotional Disorder scale.

12. The quality level of the estimate is marginal. Use with caution.

13. Some mental health disorders such as schizophrenia and bipolar disorder emerge during late adolescence or the early 20s.

14. The NLSCY includes a parent-reported version of the scales for youth aged 7 to 9, but the results are not reportable because of the small sample sizes.

15. The NLSCY also has an analogous Anxiety and Emotional Disorder scale. However, the correlation between the scale and the emotional, psychological or nervous difficulties diagnosis is very weak, compared with the correlation between the Hyperactivity – Inattention scale and an ADHD diagnosis.

4 Conclusion

That certain groups of students may face a variety of barriers to accessing postsecondary studies is well known. These barriers include low family income, having parents with no postsecondary qualifications, or poor academic performance. However, little attention has been paid to another group of students who may face unique challenges: those with a neurodevelopmental condition (NDC) or a mental health condition (MHC). Do such conditions pose additional limitations in enrolling in postsecondary education (PSE) above and beyond family background, academic performance and sex?

Using linked survey and administrative tax data, the study finds that 77% of youth who were not diagnosed with any long-term health condition in their school years (the comparison group) enrolled in PSE by their early 20s. In contrast, 60% of youth diagnosed with an NDC enrolled in PSE in the same time frame (a gap of 17 percentage points), while only 48% of youth diagnosed with an MHC enrolled in PSE (a gap of 29 percentage points compared with youth in the comparison group). Youth diagnosed with both an NDC and an MHC were even less likely to enroll: only 36% went on to PSE (41 percentage points behind youth in the comparison group). Differences in sex, academic performance and family background (e.g., parental income and education) explain only about one-third of these gaps. Among youth with an MHC, the most likely diagnosis was Attention Deficit Hyperactivity Disorder (ADHD). Moreover, youth with an ADHD diagnosis were less likely to pursue PSE than youth diagnosed with other types of MHCs such as emotional, psychological or nervous difficulties.

These findings suggest that youth diagnosed with an NDC or MHC may face barriers to attending PSE that are distinct from those confronting other youth. For example, students with an MHC may not have received proper support in their school years. If they attend PSE, students with ADHD may have a difficult time sitting still or paying enough attention to take notes. Some of the challenges faced by students with disabilities may be addressed by online learning opportunities, which require little to no in-class time and may be more self-paced than traditional in-class courses.¹⁶ However, research is lacking in this area.

Currently, government student aid earmarked for disability requires a medical certificate to support the diagnosis. However, this study notes that the mental health status of youth is not necessarily a binary outcome governed by a clinical diagnosis. Indeed, the study shows that youth with moderate hyperactivity or inattention are also considerably less likely to enroll in PSE than other youth.

Finally, eligibility for the Canada Student Grant for Students with Permanent Disabilities makes it clear that the condition must be permanent or “a functional limitation caused by a physical or mental impairment that restricts the ability of a person to perform the daily activities necessary to participate in studies at a post-secondary school level or the labour force; and is expected to remain with the person for the person’s expected life.” (Government of Canada n.d.). This may exclude certain conditions that can, in certain situations, be temporary or transient, such as depression, anxiety or even some symptoms of ADHD. These conditions may yet impact an individual’s ability to participate in PSE. Jarvey, McColl and Usher (2017) noted that health professionals are often reluctant to label these MHCs as permanent and further argue that the definition (for eligibility purposes) should be broadened to include episodic and temporary disabilities.

16. Some studies have shown that once enrolled in PSE, students with disabilities are equally likely to graduate as those without disabilities (Jorgensen et al. 2005; Wessel et al. 2009; Stewart and Schwartz 2018). However, students may self-select into PSE according to the extent to which existing resources enable them to succeed. Students with disabilities who did not attend PSE may have been deterred by a lack of resources to suit their particular needs.

Appendix

Appendix Table 1
Description of study variables

Variable	Description	Data source
Youth characteristics		
Sex	Categorized into (0) male, and (1) female.	NLSCY
Age	In years ranging from 7 to 15.	NLSCY
Neurodevelopmental conditions	Categorized into four long-term conditions that lasted or were expected to last six months or more and were diagnosed by a health professional: epilepsy, cerebral palsy, intellectual disability and learning disability.	NLSCY
Mental health conditions	Categorized into two long-term conditions that lasted or were expected to last six months or more and were diagnosed by a health professional: attention deficit disorder (with or without hyperactivity) and emotional, psychological or nervous difficulties.	NLSCY
Mathematics score	Categorized according to the number of correct math scores: (1) 0 to 5, (2) 6 to 9, (3) 10 to 13, and (4) 14 or more, with ranges corresponding to quartiles.	NLSCY
Parent characteristics		
Highest educational attainment	Categorized according to highest obtained level of schooling of the PMK and the spouse of PMK (if applicable); categorized into (1) less than secondary school; (2) secondary school graduation; (3) beyond high school, some trade school or community college or university; (4) diploma or certificate from trade school; (5) diploma or certificate from community college; (6) bachelor's degree; and (7) master's, degree in medicine, doctorate.	NLSCY
Aspiration for highest education for the youth	Categorized into (1) secondary school or less; (2) community college, CEGEP or nursing school; (3) trade, technical or vocational school, or business college; and (4) university.	NLSCY
Family characteristics		
Household income	Categorized according to recorded household income or derived personal income of the PMK: (1) less than \$30,000, (2) \$30,000 to \$39,999, (3) \$40,000 to \$49,999, (4) \$50,000 to \$59,999, (5) \$60,000 to \$79,999, and (6) \$80,000 or more.	NLSCY
Household size	Categorized according to the total number of people in the household (including the child): (1) two people, (2) three people, (3) four people, (4) five people, and (5) six or more people.	NLSCY
Province of residence	Categorized into (10) Newfoundland Labrador, (11) Prince Edward Island, (12) Nova Scotia, (13) New Brunswick, (24) Quebec, (35) Ontario, (46) Manitoba, (47) Saskatchewan, (48) Alberta, and (59) British Columbia.	NLSCY
Main outcome variable		
Enrollment in postsecondary education	Categorized according to educational deductions for part-time or full-time studies or tuition fees for self: (0) no, and (1) yes.	T1FF

Notes: NLSCY: National Longitudinal Survey of Children and Youth; T1FF: T1 Family File; PMK: person most knowledgeable about the youth.

Sources: Statistics Canada, National Longitudinal Survey of Children and Youth (2000-2001) and T1 Family File (2004 to 2015) linked data.

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