Canadian Journal of Education
Revue canadienne de l'éducation

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Cite this article

Article abstract

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A Comparison of High School Graduation Predictors Between Two Ontario Student Cohorts

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Abstract

While a number of factors have already been shown to impact variations in graduation rates among students in Canada, there is little research examining the changing impact of these factors on Ontario students' secondary education completion over time. This research draws on data from two Grade 9 cohorts (2006 and 2011) from the Toronto District School Board in order to unpack how predictors of high school graduation change over time. In particular, we use multivariate analysis to examine whether predictors (including gender, race, parental education, household income, suspension, academic achievement, special education needs, and Grade 9 absenteeism) are significant by cohort of students and if there are gaps in secondary school success between subgroups. Findings demonstrate that high school completion is increasing over time and that there is a diminishing importance of parental education and neighbourhood household income as a predictor of high school graduation. However, we do find evidence of persistent under-achievement among students of certain racial backgrounds, lower academic streams, and those with high rates of absenteeism. We argue that additional data infrastructure in Ontario and beyond are necessary to identify how our findings generalize to the province as a whole.

Keywords: high school graduation, academic achievement, longitudinal

Résumé

Bien qu'il ait déjà été démontré qu'un certain nombre de facteurs influencent les variations des taux d'obtention de diplôme chez les élèves au Canada, peu de recherches se sont penchées sur les conséquences de ces facteurs sur l'achèvement des études secondaires des élèves ontariens au fil du temps. La présente recherche repose sur des données recueillies auprès de la Commission scolaire du district de Toronto concernant deux promotions de 9e année (2006 et 2011) et vise à déterminer comment les indicateurs relatifs à l'obtention des diplômes d'études secondaires évoluent au fil du temps. Plus particulièrement, nous recourons à une analyse multivariée pour déterminer si les indicateurs (notamment le sexe, la race, le niveau d'éducation des parents, le revenu du ménage, la suspension, le rendement scolaire, les besoins en matière d'éducation

spécialisée et l'absentéisme en 9e année) sont significatifs par groupe d'élèves et s'il y a des écarts en matière de réussite au secondaire entre les sous-groupes. Les résultats obtenus prouvent que le taux d'achèvement des études secondaires augmente au fil du temps et que l'importance de l'éducation des parents et du revenu moyen des ménages du quartier en tant que facteurs prédictifs de l'obtention du diplôme d'études secondaires diminue. Cependant, nous observons la persistance de mauvais résultats chez les élèves de certaines minorités raciales, dans les classes inférieures et chez ceux qui ont un taux d'absentéisme élevé. Nous estimons que des infrastructures de données supplémentaires sont nécessaires en Ontario et ailleurs pour savoir si les résultats que nous avons obtenus s'appliquent à l'ensemble de la province.

Mots clés : diplôme d'études secondaires, réussite scolaire, longitudinale

Introduction

Students who do not complete high school are at greater risk for long-term economic hardship, impaired health, and poor family functioning, which can perpetuate socio-economic inequality over generations (Conger et al., 2010). In the current labour market, having a high school diploma is critical for accessing stable employment and living wages (Robson et al., 2014; Uppal, 2017). However, in 2017–18, about 19% of Canadian youth failed to receive their high school diploma (Statistics Canada, 2020). While the risks experienced by those students who do not complete high school pose significant challenges to both individual well-being and to the overall economy, we are still lacking a clear understanding of how high school completion varies across student groups and cohorts.

Certain characteristics of students are associated with being less likely to graduate from high school. Both racial and socio-economic background have been demonstrated as persistent influences on secondary education completion, with Black and/or African American, Latin American, and low socio-economic students having some of the lowest graduation rates (Brown et al., 2017; Martin & Smith, 2017; Robson et al., 2014). Students with learning disabilities (e.g., attention deficit disorder [ADD], attention deficit hyperactivity disorder [ADHD]) were also significantly less likely to graduate from

high school than their peers without those designations, as are students who are placed in lower academic streams (Gil et al., 2019; Marsh, 1991; Plasman & Gottfried, 2018; Smith et al., 2012). These outcomes have been related to diminishing economic returns for all groups (Murray et al., 2000). Despite this, we understand little about how these and other factors change among Canadian students over time. An overview by Gallagher-Mackay (2017) demonstrated that research focused on secondary education completion and equity of access to higher education remains incomplete. Longitudinal data linking contextual and process data with outcomes is essential to explain the pathways of underrepresented groups, and to forge solutions that will improve success in secondary school.

    To better understand the factors that influence Ontario student high school completion rates and how the impacts of these factors have changed, we use a unique longitudinal dataset from the Toronto District School Board (TDSB). Drawing on data from 28,185 students from two TDSB cohorts, we answer the following research questions: (1) How have the impacts of certain predictors of high school graduation changed over time? (2) Are the same predictors significant for different cohorts of students? and (3) Are there gaps in secondary school success between subgroups of students, particularly those who have been historically underrepresented? Findings from this research demonstrate that high school completion rates increased over time and that there was a diminishing importance of parental education and neighbourhood household income on this outcome. However, we also find evidence for greater odds of non-completion among students in lower academic streams, those with greater absenteeism, and those who do not pass their Ontario Secondary School Literacy Test.

Changes in High School Graduation over Time

To explain how social contexts influence high school dropout rates among student groups, it is important that we identify shifting historical trends that have the potential to impact academic achievement. Changes have occurred in the proportions of students completing high school education over the last half-century. At the turn of the century, it was not uncommon for students to leave school early to pursue employment. However, by the early 1960s, not completing high school was reconstructed as a social problem (Anisef & Andres, 1996; Gubbels et al., 2019). Having a high school diploma has since been desi-gnated as a safeguard for the Canadian economy, placing greater emphasis on students

to finish high school in order to be employable. Requirements for jobs, however, have dramatically changed over the last 20 years, requiring more people to complete their high school education (and beyond) than in previous generations (Livingstone, 2019). The greater emphasis on high school completion has been accompanied by a dramatic decrease in the proportion of students leaving school early, an increase that continues today. By 2016, the five-year graduation rate increased to 86.5%, (up 18 percentage points from 2004), and the four-year graduation rate increased to 79.6% (up 23 percentage points from 2004) (Government of Ontario, 2017). In addition to the realization by parents of the importance of children completing their formal education, the rise in graduation rates can also be attributed to policy interventions, such as the Student Success/Learning to 18 Strategy that the Ontario government introduced in 2003.This strategy aimed to diminish the gap between students who completed high school and those who did not (Campbell-Phillips, 2020; Zegarac, 2007). However, despite the widespread increase in high school completion, little is known about how those rates vary across groups.

Differences in high school achievement are influenced by large-scale inequalities across student groups. For example, American sociologist James Coleman and colleagues (1966) produced a groundbreaking report in the mid-1960s that concluded that parental socio-economic status did a far better job in explaining student success than did school resources. Furthermore, in schools that served those from a broad range of socio-economic backgrounds, large inequalities in test score outcomes emerged *within* schools. While school resources can be of importance, they are not as powerful in their consequences as family background. Since the publication of the Coleman et al. (1966) report, there has been a consensus that the relative gap between middle- and working-class students, with respect to their academic success within secondary schools, has remained relatively stable (Assari, 2019; Callan et al., 2017; Davis-Kean, 2005; Finnie & Childs, 2018; Finnie et al., 2015; Jackson & Moffitt, 2017; Zarifa et al., 2018). Robson (2013) argued that school readiness or preparation for early learning is an important factor in school success, with low-income children being more disadvantaged in the classroom than higher-income students.

Along with socio-economic background, there remain additional student characteristics that have the potential to impede secondary education completion. However, these influences have been less frequently studied. Work by Mayor and Suarez (2019) demonstrated that research tended to focus on socio-economic status, gender, language, immigrant status, and family structure. Their review revealed a dearth of research on how race,

learning needs, and academic engagement influenced academic achievement in the Canadian context. The small body of work that examined the impact of race on high school completion demonstrated that self-identified Black and Latin American students had the lowest graduation rates among all ethno-racial groups (Brown & Tam, 2017). However, Black students experienced the greatest increase in graduation rates between cohorts, improving by 13 percentage points from 64% (2006 cohort) to 77% (2011 cohort) (Brown & Tam, 2017). Brown and Tam (2017) also note that East Asian students had the highest graduation rates in both cohorts. An increased use of longitudinal data in analyzing student academic performance would help us unpack some of these persistent inequalities among student groups in the Ontario context.

One group that is particularly at risk for not completing secondary education is those with additional learning needs. Longitudinal studies of high school students with additional learning needs (excluding gifted designations) demonstrated that they were significantly less likely to graduate high school (Plasman & Gottfried, 2018). Many students with additional learning needs were those with learning disabilities. A learning disability is commonly understood as "a significantly reduced ability to understand new or complex information, to learn new skills, or a reduced ability to cope independently, which starts before adulthood with lasting effects on individual development" (Cluley, 2017, p. 25). The gap in graduation between students with and without learning disability designations was likely in part due to the additional challenges those student groups face, such as having trouble concentrating, difficulty with planning, or memory deficits. However, some recent studies demonstrate that, holding cognitive ability constant, those students with a learning disability were significantly more likely to graduate high school than their peers without learning disabilities (Murray et al., 2000; Showers & Kinsman, 2017). That is, if you compare students with learning disabilities and those without with the same IQs, those with learning disabilities were more likely to graduate high school. This effect potentially demonstrates that if students with learning disabilities are provided with adequate academic and social supports, they are able to perform to the same degree as or surpass their peers without a learning disability designation (Showers & Kinsman, 2017). This effect has not been examined over time in Ontario.

The academic streams students are enrolled in during their high school education also have the potential to impact the likelihood of graduation. Streaming refers to curricula that are demarcated into perceived ability tracks; for example, "academic math" and

"workplace math," with the former envisioned for those who are likely to a have a post-secondary pathway and the latter for those who are not. As of 1999, the Ontario Ministry of Education requires Grade 9 and 10 students to choose between the academic (university-directed) stream or locally developed essential (workplace-directed) stream (Anisef et al., 2010). However, math is currently being de-streamed for all Ontario high school students (Alphonso, 2021). Unfortunately, we know that those who enter the essentials stream are more likely to drop out than those who elect to follow the university pathway (Anisef et al., 2010). Reasons for this include that academic achievement, post-secondary aspirations, and subsequent attainment are typically higher in higher-ability streams.

Research also demonstrates the importance of academic engagement in explaining school success. Frequent absenteeism has been shown to have immediate and long-term impacts on the academic performance and social functioning of students, and to negatively influence the likelihood of graduation (Henderson et al., 2014). Chronic absenteeism is recognized as an issue in education, limiting the life chances of students from an early age. Under the Ministry of Education's Student Success/Learning to 18 strategy "Attendance Works," Student Success Teachers were allocated to TDSB boards by 2007–8, after the deputy minister called for their implementation in 2006 to offset student high school dropout rates (Ontario Ministry of Education, 2005, 2006). The Ministry of Education's Student Success/Learning to 18 Strategy was generally designed to increase graduation rates, support academic achievement, provide relevant/interest-based learning resources for students and help students to transition from elementary to secondary school (Ungerleider, 2008). Student Success Teachers work to ensure that students can earn enough credits to graduate, often through academic alternatives in terms of timetables, workloads, and educational settings. Despite these initiatives and some research demonstrating their positive impact on graduation rates overall (Ungerleider, 2008), we lack information about how absenteeism impacts graduation rates for Ontario students over time.

Methods

Data

Our research questions address the determinants of high school success using longitudinal cohort data from the Toronto District School Board (TDSB). The TDSB is by far the largest school board in Ontario and in the country, with over 246,000 students at the elementary and secondary levels (Toronto District School Board, 2014). The Toronto District School Board is in Toronto, where just over half of the population self-identifies as a visible minority. The largest visible-minority population in Toronto self-identifies as Southeast Asian and makes up about a third of the total population (Ontario Ministry of Finance, 2018). The TDSB has created and extensively analyzed a unique longitudinal data set that gathers a range of information regarding high school students. This data set includes Student Census-based survey information about students' backgrounds and attitudes, plus comprehensive administrative data including information about key educational processes, such as identification for special education and placements, school attendance, discipline, and course enrolments in high school.

The current study used this data bank to examine Grade 9 TDSB cohorts from 2006 and 2011 to assess the impact of different factors, over time, on rates of student graduation. The sample size for this study was 28,185 students total, with 13,296 students in our first cohort (2006) and 14,889 students in the second cohort (2011). The cohort data included administrative data on students' time in high school as well as demographic and attitudinal data that has been linked with the TDSB Student Census studies conducted in 2006 and 2011. We followed each cohort from the beginning of their Grade 9 year through to high school graduation (in either Year 4 or 5). The two cohorts we used in this article will be referred to as Cohort 1 and Cohort 2. Students in Cohort 1 were in Grade 9 in 2005–6 and wrote the Student Census in 2006. They would have been in Year 4 (Grade 12) in 2008–9, and students in Cohort 2 were in Grade 9 in 2010–11 and wrote the Student Census in 2011. They would have been in Year 4 (Grade 12) in 2013–14. Selecting the cohorts to employ in this analysis of graduation rates required us to examine the data carefully to determine which cohorts would be the most comparable, a consideration of available variables, the years in which the Student Censuses was written, completion rates, and patterns of missing data.

Variables

The outcome of interest for this study was whether the student graduated from a TDSB high school at the end of the fourth year (or had accumulated enough credits to graduate) or did not graduate from a TDSB high school at the end of the fourth year. This information was derived from TDSB administrative data and was coded as a dichotomous variable, where 1 represents students who graduated and 0 represents those who did not graduate.

Student and school characteristic variables were also used to investigate their association with high school completion and included: sex, self-identified race, suspensions (if any), academic achievement, academic stream, whether or not they passed the Ontario Secondary School Literacy Test, parental post-secondary education, family structure, country of birth, special education needs, Grade 9 absenteeism, median neighbourhood income, and school enjoyment. The variable "sex" is a self-reported binary variable, female and male, with female representing 1 and male as the reference category (= 0). For the variable "stream," Ontario high schools offer two streams of courses: applied and academic. Academic streams are aimed at eventually having graduates enter post-secondary education, particularly university. This variable data was obtained through TDSB administrative data and was represented by a dichotomous variable, with a majority of academic courses equal to 1 and a minority of applied courses equal to 0. The variable for race was originally measured using a 14-category self-identification item on the Student Census; that is, students identified (from a list of categories) the one they felt best described their racial identity (Yau & O'Reilly, 2007). Some of these categories were combined for the purposes of the analysis (e.g., Black African, Black Caribbean, and Black Canadian were combined into a single Black category), resulting in eight race categories: Black, East Asian, Latin American, Middle Eastern, Mixed, South Asian, Southeast Asian, and White, with White as the reference category (= 0). We were not able to include Indigenous students in the analysis given their small numbers (i.e., < 50 per cohort).

In terms of student academic measures, our variable for suspension was coded as a dichotomous variable, where 1 represents suspended at least once (at any point in K–12) and 0 represents that the student was never suspended. For TDSB students' Grade 9 achievement score, there were four compulsory Grade 9 subjects: English, mathematics, science, and geography. Research at the TDSB has found that marks in these four subjects and other Grade 9 achievement indicators, such as total credit accumulation, are

highly related to post-secondary success. We have followed the lead of the TDSB in its most recent research collaborations with the University of Toronto and York University (Brown et al., 2019) and created a composite Grade 9 achievement variable using the four compulsory subjects and total Grade 9 credit accumulation. This resulted in four possible categories: very high achievement (level 4 - A) in all four mandatory Grade 9 credits, high achievement (grade of level 4 - A) in one to three of the four mandatory Grade 9 credits, medium achievement (a mark of below 80 in all four subjects, but with a credit accumulation of eight or more Grade 9 credits) and low achievement (completed fewer than eight Grade 9 credits). The reference category for this study was low achievement.

In addition to variables for suspension, Grade 9 achievement, and stream, we also included a measure for students' literacy scores. A literacy requirement is necessary to obtain a high school diploma in Ontario, which is usually fulfilled by the Ontario Secondary School Literacy Test (OSSLT). This variable was derived from administrative records, which indicated whether the student passed the OSSLT in Grade 10, which is the first time they are eligible to write it, or did not pass; did not pass was the reference category (= 0). It is important to note that if students were absent, deferred, or failed, they could take the test in Grade 11 or 12, or take a literacy course for the requirement, which also counts as an English credit for graduation. OSSLT is a requirement for college and university programs in Ontario.

The Student Census also contained items asking students to supply the highest level of education attained by parents or guardians. This was constructed as a dichotomous variable where 1 represented at least one parent participating in post-secondary education (either college or university) and 0 represented no parental post-secondary participation. In addition to parents' education, a dichotomous variable for parent household structure was also created, indicating whether the student lived with two parents or not, with the latter as the reference category. A variable for whether the student was born in Canada or abroad was also created using data from the Student Census. This dichotomous variable indicated whether the student was born abroad (= 1) or in Canada, with born in Canada as the reference category (= 0).

In addition to family characteristics and student birthplace we also employ a measure of income. Data on family income was not directly available from the Student Census (students often do not know). To estimate median neighbourhood family household income, a variable from Environics Analytics measuring median household income

as of 2018 was used, which is associated with six-digit postal-code dissemination areas (matched by postal code to the Census Dissemination Area of around 300 households). A ranking of 1 corresponds to the lowest income group and a ranking of 20 corresponds to the highest income group. Thus, it should be noted that the variable itself is not attached to the characteristics of an individual student, but rather to the characteristic of the neighbourhood in which they lived. Although not ideal, this type of income measurement is commonly used in research (Dooley et al., 2017).

The TDSB administrative data contained information on whether students have been identified as having special education needs (SEN), usually in the form of additional support or resources to accommodate sensory, physical, learning, or mental health difficulties. This was created as a dichotomous variable, with no SEN as the reference category (no SEN = 0). For the purposes of this analysis, we categorized students identified as gifted, technically a SEN category in the TDSB, as having no SEN. Absenteeism, or the number of days students were absent from school, was measured by a continuous variable drawn from administrative data and indicates how many days a student was absent during Grade 9. Lastly, we included a measure for students' enjoyment of school. In the Student Census, students were asked to respond to the statement, "I enjoy school," on a 5-point Likert-type scale, where 1 = all the time and 5 = never. We reverse coded this item, so that 1 = never and 5 = all the time, for ease of interpretation.

Analysis

There were two stages to the analyses that we performed. The first was a purely descriptive comparison of Cohorts 1 and 2 using average scores on the variables of interest. This allowed us to understand changes in characteristics across cohorts. We then employed multivariate strategies that allowed us to look at the effect of numerous indicators on high school graduation. Unlike bivariate models that examine the association between two variables and, as a consequence, may overstate their relationship, multivariate models allow us to control for the multiple effects of various characteristics that are known from the literature to be predictors of high school graduation. Additionally, we can look at the cohort effect on the impact of variables (i.e., has there been a change in the effect of the variables from Cohort 1 to Cohort 2?). We undertook such an analysis by using interaction terms, as explained below.

Findings

Proportions Across Cohorts

To understand how individual and school effects impact high school graduation across cohorts we first listed the means for all variables included in our final model (See Table 1). We noted that the number of TDSB students graduating from high school increased by about 7% from Cohort 1 to Cohort 2. This analysis also demonstrated proportional changes in representation across cohorts. There has been an overall decrease in suspensions across the two cohort groups (from 20% for Cohort 1 to 14% for Cohort 2), decreases in the proportion of students born abroad (35% for Cohort 1 to 30.5% for Cohort 2), decreases in the average number of days absent in Grade 9 (4.1 days for Cohort 1 to 3.7 days for Cohort 2) and the proportion of students with SEN increased (from 11% in Cohort 1 to 18% in Cohort 2). This analysis also demonstrated changes in academic achievement scores across cohorts that are consistent with previous research (Brown et al., 2017; Brown & Tam, 2017). Achievement and graduation rates have generally increased every year since 2000, regardless of education policy changes.

Table 1

Descriptive Statistics by Cohort

Variable	Cohort 1 (N = 13,296)	Cohort 2 (N = 14,889)
Outcomes		
High school graduation	0.78	0.84
Female	0.50	0.49
Self-identified race		
Black	0.11	0.12
East Asian	0.18	0.17
Latin American	0.02	0.02
Middle Eastern	0.04	0.06
Mixed	0.06	0.07
South Asian	0.19	0.22
Southeast Asian	0.04	0.05
White	0.36	0.29

Variable	Cohort 1 (*N* = 13,296)	Cohort 2 (*N* = 14,889)
Ever Suspended	0.20	0.14
Academic achievement		
low – fewer than 8 credits	0.12	0.11
med – below level 4 but 8+ credits	0.31	0.31
high – level 4 in 1 to 3 subjects	0.40	0.43
very high – level 4 in all 4 subjects	0.14	0.15
Academic stream	0.77	0.77
Passed OSSLT first time	0.79	0.78
Parent has PSE	0.64	0.66
Two-parent household	0.77	0.80
Born abroad	0.36	0.31
Special education needs	0.11	0.18
Grade 9 absenteeism	4.10	3.74
Neighbourhood HH income (ordinal)	10.76	10.83
Enjoy school	3.51	3.59

Predictors of High School Graduation

In addition to demonstrating the proportional differences between student groups across cohorts, we also conducted a binomial logistic regression where high school graduation was the outcome of interest. Because we examined two cohorts spaced five years apart, we can discuss not only the variables that are significant predictors for each outcome of interest, but also changes in the significance of predictors over time.

Several variables were significant predictors of high school graduation (See Table 2). Results are presented as odds ratios, where values over 1 indicate that the variable is associated with an increased odds of high school graduation and where values below 1 indicate that the variable is associated with a decrease in the odds of graduation. Girls were more likely (OR = 1.15, thus 15%) than boys to graduate in the later cohort, despite there not being a significant difference between the sexes in the earlier cohort. However, the only racial categories that were statistically significant predictors in either cohort were those students who self-identified as East Asian, South Asian, and Southeast Asian, and these were all positive. In other words, students who were from these racial groups were more likely to graduate high school compared to the reference group, which was White. This finding is consistent with previous research demonstrating that East Asian students tended to have the highest graduation rates among Canadian student populations (Brown & Tam,

2017). Being from a two-parent family was also a significant positive predictor relative to other family structures, and having SEN also had positive effects, but only for Cohort 1. Students with special needs may be more likely to graduate from high school because of additional academic support and resources available to them. For example, the TDSB implemented Student Success Teams (SST) to provide additional support to students with SEN (Toronto District School Board, 2019). Student Success Teams were allocated to TDSB boards by 2007–08 (Ontario Ministry of Education, 2005, 2006) and members include psychologists, social workers, occupational therapists, physiotherapists, child/youth workers and speech/language pathologists (Toronto District School Board, 2019). The role of SST members is to provide a mechanism for effective collaboration of TDSB and community-based resources (Toronto District School Board, 2019). Given the timing of our cohorts in their progress through high school, students in Cohort 2 would have had Student Success Teams in place throughout their high school experience, while such programs would have just been in their initial phases for students in Cohort 1. This fits with previous research demonstrating that, holding cognitive ability constant, students with learning disabilities were more likely to graduate from secondary education than their peers without that designation (Murray et al., 2000; Showers & Kinsman, 2017).However, from our analysis, this effect seemed to diminish over time. While Cohort 1 students with special education designations were more likely to graduate than their peers without special education needs, Cohort 2 students with special education needs were not significantly more likely to graduate than their peers without special education needs. More research is needed investigating the effects of learning disabilities on Canadian students' academic achievements over time.

Being born outside of Canada was also a significant negative predictor. Students who were born outside of Canada were less likely to graduate high school than their domestic-born peers. This effect was also consistent for both student cohorts and perhaps is attributable to the challenges foreign-born students face navigating new education systems and settling into Canadian society. Our analysis also demonstrated that parental PSE had no significant effect on high school graduation for either student cohort. This finding runs counter to the findings of both Coleman et al. (1966) and more recent work (Davis-Kean, 2005; Finnie & Childs, 2018; Zarifa et al., 2018) arguing that socio-economic differences and parental education among student families offset any resources provided by schools. It seems that other academic and student-level measures have greater predictive power with respect to graduation rates than in previous generations.

Table 2

Logistic Regression Predicting High School Graduation

Odds Ratios	Cohort 1 HS grad	Cohort 2 HS grad	Variable*cohort interaction
Female	1.03	1.15**	
Self-identified race			
Black	1.09	1.14	
East Asian	1.52***	1.29**	
Latin American	0.93	0.86	
Middle East	0.98	1.05	
Mixed	0.82	0.98	
South Asian	1.07	1.28**	
Southeast Asian	1.13	1.33*	
Ever suspended	0.52***	0.47***	
Academic achievement			
Medium	3.14***	3.90***	***
High	4.88***	4.91***	
Very high	14.03***	13.00***	
Academic stream	1.53***	1.29***	
Passed OSSLT	1.91***	2.12***	
Parent PSE	1.02	1.07	
Two-parent household	1.48***	1.39***	
Born abroad	0.74***	0.75***	
Special education needs	1.54***	1.03	***
Grade 9 absenteeism	0.93***	0.95***	***
Median neighbourhood income	1.02***	1.01	***
Enjoy school	1.13***	1.13***	
N	13,296	14,889	

Measures of academic behaviour and academic success (also commonly referred to as prior attainment) behaved as expected. Being in the academic stream (compared to not being in the academic stream) was a significant positive predictor of high school graduation in both cohorts (OR = 1.524 for Cohort 1 and 1.292 for Cohort 2). Passing the OSSLT on the first eligible attempt and enjoying school were also significant positive predictors. The Grade 9 composite achievement variable also has positive predictive effects, with the strength of the relationship increasing with each level up, remembering that these are all in relation to the lowest category of that variable. In other words, if we look at the results for Cohort 2, for example, those who scored in the medium category of the Grade 9 composite variable for academic achievement were 3.9 times more likely to graduate high school as those in the lowest category; those in the high category were 4.9 times more likely to graduate as those in the lowest category; and those who were in the very high category were 13 times as likely to graduate as those in the lowest category. The variables that were negatively associated with high school graduation were, unsurprisingly, suspensions and absenteeism.

Changes Across Cohorts

For changes between cohorts, we used a pooled model, with the variable indicating cohort membership interacted with all predictor variables (results not shown). Those that were statistically significant are indicated in the last column of Table 2. A significant interaction would indicate that the association between an independent variable and high school graduation varied according to cohort. Because coefficients (or odds ratios) produced from such an estimation are difficult to "eyeball" in terms of their overall relationship, we use predicted probabilities to graph the likelihoods of the outcomes in question as it is associated with the independent variable of interest, to illustrate the results more effectively. In Table 2, there were four variables that showed a statistically significant difference between Cohort 1 and Cohort 2: academic achievement, having a special education need, absenteeism, and neighbourhood household income. The effects of academic achievement in Grade 9 on high school graduation changed between the two cohorts for those in the "medium" category. Having "medium" achievement (below Level 4 but eight or more credits) was dependable in predicting high school graduation for Cohort 2 compared to Cohort 1, meaning that medium achievers in Cohort 2 were more likely to

graduate high school relative to medium achievers in Cohort 1. Figure 1 illustrates these differences. Those in the "high" and "very high" categories were still more likely than the medium achievers to graduate in both cohorts, but their graduation rates were not significantly higher for Cohort 2 compared to Cohort 1, while the medium achievers made a significant gain in graduation rates during that same period.

Figure 1

Interaction Between Cohort and Academic Achievement to Predict High School Graduation
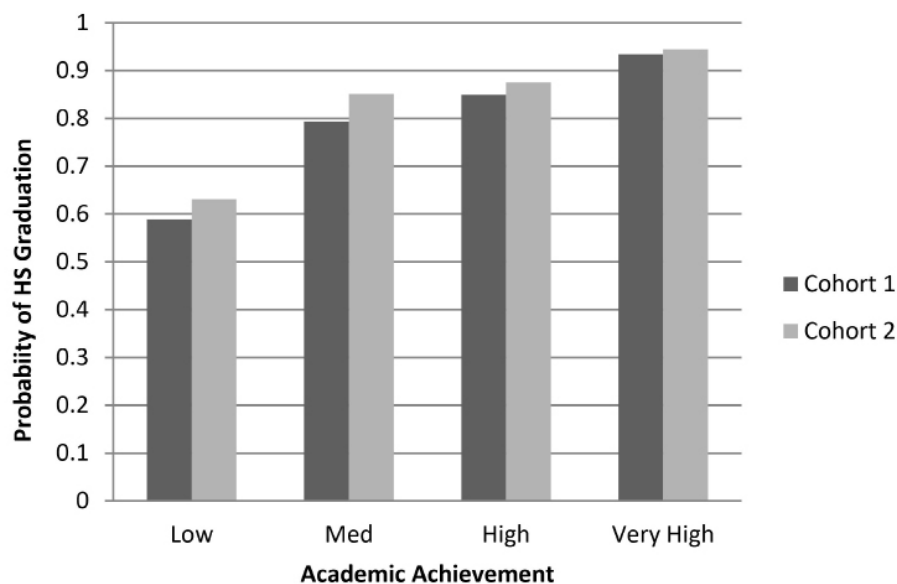
Other cohort differences in high school graduation prediction included the effects of having a special education need, which increased the odds of graduation by 1.5 times for Cohort 1 but had no effect for Cohort 2, controlling for the other variables in the model. Figure 2 illustrates this difference using predicted probabilities of high school graduation, showing that the gap between students with and without special education needs in terms of graduating high school decreased for Cohort 2. This finding makes it appear as though special education needs were advantageous for graduation for Cohort 1, but for Cohort 2 the difference between SEN and non-SEN students closed. However, a closer inspection of this result in the context of SEN students reveals a larger trend; that is, all students, both SEN and non-SEN, experienced increases in graduation rates from Cohort 1 to Cohort 2.

Figure 2

Interaction Between Cohort and Having a Special Education Need to Predict High School
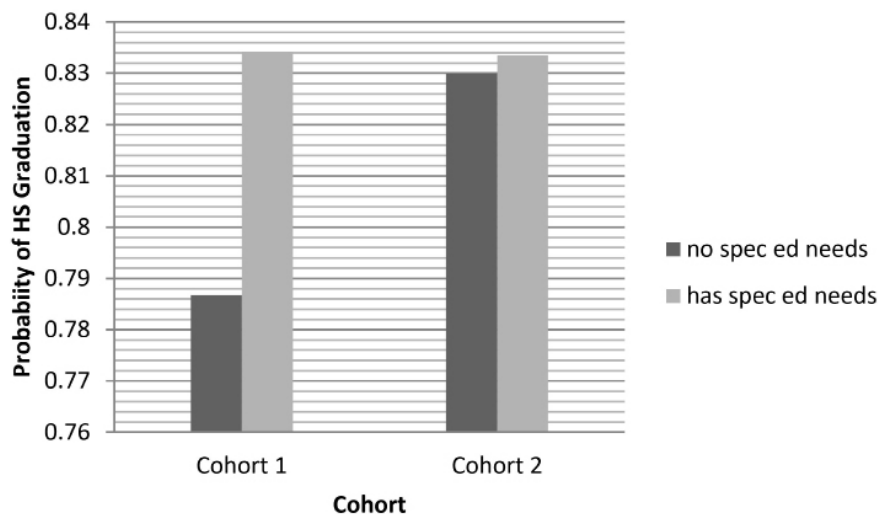

Figure 3 visualizes the association between absenteeism and graduation from Cohort 1 to Cohort 2. While absenteeism was a statistically significant negative predictor in both cohorts, its effect weakened over time. Figure 3 shows that the effect of one absence on graduation was quite similar for both cohorts but increasing numbers of absences had a much stronger negative effect in Cohort 1 than Cohort 2, indicating that the association flattened in the intervening years. The relationship was much steeper for Cohort 1, with 10 absences associated with around 0.62 odds in graduation. In contrast, in Cohort 2, the odds rose to 0.74 for students with the same number of absences. We note that the overall decline and lessening influence of absenteeism on graduation rates coincided with the introduction of educational programming aimed at supporting school attendance (e.g., Student Success Teachers), which may have played a part in increasing graduation rates of students who were more likely to be absent from school.

Figure 3

Interaction Between Cohort and Grade 9 Absenteeism in Predicting High School Graduation
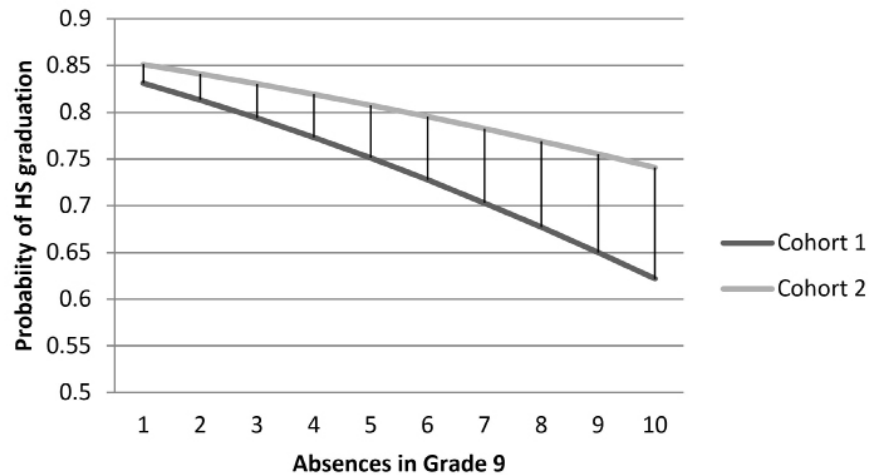
Being a resident of a neighbourhood with higher income increased the probability of high school graduation for Cohort 1 but was not statistically significant in Cohort 2. Again, this relationship flattened from Cohort 1 to Cohort 2. This indicates that the effect of neighbourhood income was a less important predictor of high school graduation for Cohort 2 than it was for Cohort 1.

Figure 4

Interaction Between Cohort and Neighbourhood Income Ventiles in Predicting High School Graduation
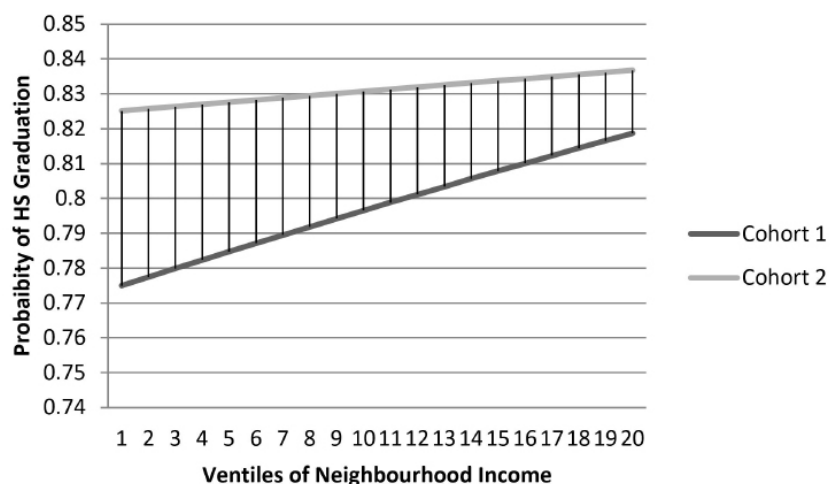
Discussion

Predictors of high school graduation were largely as expected (with the exception of SEN and family background) in the comparison of these two cohort groups, though some appeared to weaken over time. In terms of high school graduation, race was statistically significant (and positive) for only one group in Cohort 1, East Asians, and only three groups in Cohort 2: East Asians again, South Asians, and Southeast Asians (remembering that these results were in comparison to the reference group, which was White). When the cohort interaction term was introduced, none of the racial categories showed a statistically significant change from Cohort 1 to Cohort 2 in terms of high school graduation, indicating that its predictive power did not increase nor decrease to any significant degree. From these results, race appears to be a limited predictor of high school graduation. However, it must be emphasized that these findings are derived from statistical models that assume "all things being equal," but as numerous reports have demonstrated, this assumption of equality (particularly in terms of prior attainment, streaming, and special education needs) is often very faulty, with racialized children (particularly Black boys) being far more likely to be categorized as low achievers, streamed into "applied courses," and designated with special education needs (Robson et al., 2014). Our findings indicate that if racialized children had high achievement, were in the academic stream, and possessed a host of characteristics also associated with positive educational outcomes, they were just as or more likely than White children to graduate high school and confirm postsecondary education.

Patterns of significance for absenteeism and special needs were closely aligned with high school graduation. We noted that introducing the cohort year interaction term showed a significant and negative effect of absenteeism on high school graduation, but that this association weakened from Cohort 1 to Cohort 2. Not only did absenteeism decrease over time, but it also had a diminishing impact on students' likelihood of graduation. Having a SEN is shown to have a significant and positive association on high school graduation for Cohort 1, but becomes non-significant for Cohort 2. This is consistent with previous research demonstrating that students with SEN outpace their peers without those designations in graduation rates (Murray et al., 2000; Showers & Kinsman, 2017). However, the non-significant effect for Cohort 2 might be an indication that the resources SEN students are receiving in Ontario are bringing them on par with students who do not

have a SEN designation. Secondary school performance variables and their association with high school graduation were similarly unsurprising: being in the academic stream (as opposed to the applied stream), passing the OSSLT at first eligibility, and being in the medium category or better of the combined Grade 9 achievement variable were all significant and positive across both cohorts. Students who were placed or opted into more competitive academic streams experienced greater likelihood for graduation.

In addition to student race and academic performance, we also noted a significant difference between a student's neighbourhood income as a predictive power for Cohort 1, when it was statistically significant and positive, and for Cohort 2, where it lost its statistical significance. Similarly, we found no statistically significant relationship between parental PSE and high school graduation. Despite the established work demonstrating that student background has a larger impact on academic prospects than school resources (Finnie & Childs, 2018; Finnie et al., 2015; Zarifa et al., 2018), our research suggests that family factors may be weakening or non-significant in terms of secondary education eligibility after high school graduation.

Conclusions

Our research demonstrated several important influences for high school graduation rates. We note that the proportion of individuals graduating from high school increased across cohorts. In terms of predictors of high school graduation, we noted that East Asian, South Asian, and Southeast Asian students were more likely to graduate from high school than their White peers. Our analysis also demonstrated that students from two parent families, being in a high academic stream, and passing OSSLT all had positive correlations with students' likelihood of graduating. When we ran interaction terms for our predictors with cohort membership, we also found evidence of some variables' predictive power changing over time. Medium academic achievers were more likely to graduate in Cohort 2 than Cohort 1, but high and very high achieving students were generally more likely to graduate in both Cohorts than medium achieving students. Students with special education needs were more likely to graduate in Cohort 2. Lastly, our analysis demonstrated that students in Cohort 1 from high-income neighbourhoods were more likely to graduate, but that this effect was not significant in Cohort 2, leading us to conclude that income has become less important for predicting high school student graduation.

While there are several notable findings from this analysis, the overall applicability of our analysis of cohorts in the TDSB to students' experiences in other school districts or provinces is restricted, demonstrating the need for developing additional longitudinal education data sets across Canada. We are fortunate to have the opportunity to work with this TDSB dataset, which provides rich information about student achievement across different academic predictors, along with measures of key sociodemographic characteristics. However, the same information is not currently collected across other elementary and secondary school boards in Ontario and across the country. We are limited in our ability to extrapolate the findings to other jurisdictions in Ontario and across Canada because we lack longitudinal data from those places. The Ontario Education Equity Action Plan was passed in 2017 and requires all boards to collect student census data by 2023. In the near future, researchers will be better able to compare findings from the TDSB to other jurisdictions around Ontario. This will not only help researchers better understand trends over time and across space, but also help policy makers, school administrators, and teachers more effectively address the needs of the students they serve and more effectively identify systemic barriers that may exist.

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