

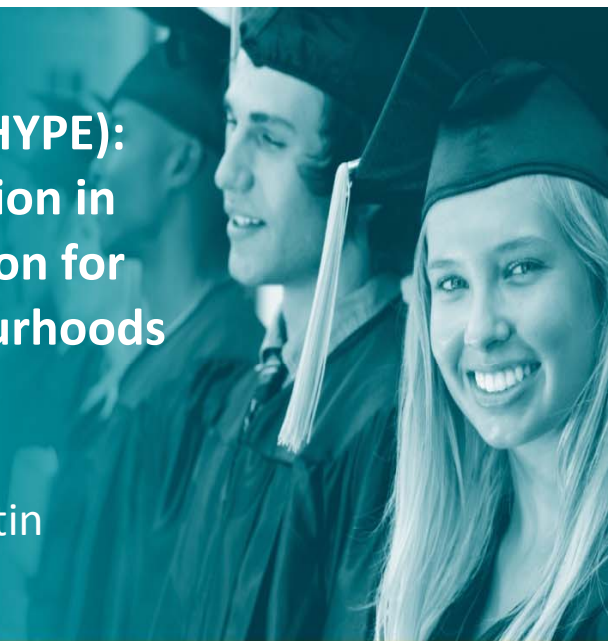


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Helping Youth Pursue Education (HYPE): Exploring the Keys to Transformation in Postsecondary Access and Retention for Youth from Underserved Neighbourhoods

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Executive Summary

This study employed a quantitative approach, supplemented with the results of a qualitative analysis, to comprehensively evaluate the effect of completion of the Helping Youth Pursue Education (HYPE) program with an eye to sharing a “best practice” model with the greater postsecondary sector. The effect of the HYPE program was measured in terms of its impact on: completion or current attendance in a college program, persistence beyond the first year of study and academic performance in college.

Since its inception in 2004, HYPE has focused on creating access to, and participation in, postsecondary education (PSE) for youth from groups typically underrepresented in PSE, through relational engagement with youth, reduction of barriers to participation and support in navigating PSE pathways. Young people who are 17–29 years of age and who live in designated Neighbourhood Improvement Areas are eligible to apply for this six-week on-campus learning experience and select from one of seven courses that are representative of each of Centennial’s academic schools. In addition, motivational and skill development workshops are offered weekly, as is an academic skills preparation course for those inclined to pursue full-time study. HYPE is tuition-free and breakfast, lunch, transit and all learning materials are provided free of charge. Upon graduation, an entry and a returner bursary are available for those who decide to enter full-time study at Centennial and who demonstrate financial need. Typically, 86% of participants graduate from the program and 33%–50% of graduates enter full-time study each year.

The factors that are correlated with whether a student might participate in HYPE may also have an impact on their success (using traditional definitions of success), therefore the risk of selection bias for random sampling poses methodological challenges. We used propensity score matching with the available HYPE participant characteristics to produce a control group of individuals at Centennial College, therefore allowing us to evaluate the effect of the program itself. Noting the uniqueness of the HYPE population, we also utilized the findings from 12 qualitative interviews with participants and facilitators to contextualize the results from our quantitative analysis.

We found that HYPE students fared worse than their non-HYPE counterparts for each of our dependent variables. The magnitude of the effect ranged from 9.5%–18.8% and each was statistically significant. Interestingly, the direction of the effect was the opposite of what was anticipated, leading us to submit our results to sensitivity testing. Results from a test of unobserved heterogeneity led us to conclude that given the lack of crucial sociodemographic measurements in our dataset, we have underestimated the effect of the HYPE program. That is, the individuals who are the most likely to enter the HYPE program are already at greater risk for withdrawal than those who do not enter it.

Upon reviewing our interviews with HYPE facilitators it is easy to envision some crucial characteristics of HYPE participants that remain unmeasured. HYPE students are often sole-support parents,¹ have had conflict with the law, or face pressures to economically support their family. Given the multiple challenges

¹ OSAP recognizes you as a sole-support parent if you “have a dependent child or children living with you full-time during your study period and you are single, separated, divorced or widowed.” <https://www.ontario.ca/page/osap-definitions#section-32>

and barriers experienced by HYPE youth, the fact that they complete the program and put themselves in a position to achieve academic performance on par with other students at Centennial, is an achievement in itself. As far as achievement in the terms of the “model route,” we must conclude that more comprehensive data that focuses on the minutia of HYPE participants’ lives is needed to give justice to the question of the impact of the HYPE program. Pursuant to our research findings, we conclude with the following recommendations to Ontario’s government and colleges:

- Additional data collection and tracking of students’ progress is key for program and service assessment and improvement, including more universal data collection through a universal identifier such as the Ontario Education Number (OEN).
- Quantitative methods alone are not sufficient for measuring the impact of a program such as HYPE due to the diversity of the student population and data limitations, regardless of our best effort to match the HYPE group with a comparable control group. Future research should include an increased proportion of qualitative measures.

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Introduction

This research paper continues the ongoing applied research and evaluation being undertaken at Centennial College to improve access, persistence and retention outcomes in its signature outreach program, Helping Youth Pursue Education (HYPE). The HYPE program focuses on personally engaging youth from underserved communities and providing them with a range of individualized supports to prepare them for the possibility of postsecondary education. This paper reports the empirical results of our investigation of the effects of HYPE program participation on student success. Our research addresses the following research questions:

- What are the student-level predictors of participating in the HYPE program at Centennial College?
- What are the differences in student success among key indicators (e.g., persistence, program completion status, academic performance) and do they vary according to participation in the HYPE program?
- How effective is propensity score matching as a framework for evaluating a program as unique as HYPE?

We begin with a description of the HYPE program and its participants. We then detail the sample for our analysis and describe the independent and dependent variables. Following this we elaborate our selected methodology including how we used propensity score matching to specify our models. The results of the analysis are then discussed and contextualized with sensitivity tests. We conclude with a discussion and a conclusion wherein our results are interpreted in consideration of a brief qualitative analysis of a series of key informant interviews with Centennial faculty, staff and peer mentors involved in the delivery of the 2015 HYPE and HYPE Works summer experience sessions. Finally, we offer recommendations for the program and for future analysis.

Background

Program Description: Helping Youth Pursue Education

History

Centennial College has been at the forefront of dedicated outreach and innovative programming that addresses the educational needs and experiences of marginalized and underserved populations in the Greater Toronto Area. The HYPE program has evolved through various iterations since it began as a two-week drumming program for youth from the Malvern neighbourhood in 2004. A focus on training for employment and employment readiness was introduced in 2005. From 2008 on, HYPE was redesigned and implemented with public- and private-sector support, to offer a six-week on-campus educational experience, including financial support, to youth aged 17–29 living in priority investment neighbourhoods.² Since 2010, HYPE has been embedded in the core budget of Centennial College as a component element of the Community Outreach Office.

Program Philosophy

Following the Toronto youth violence crisis of 2004–05, Centennial College and other stakeholders collaborated to provide a comprehensive response. This response was spearheaded by the provincial government and major government agencies in the hopes of designing a “social opportunity strategy” to “mobilize social capital and other assets in our communities to address these roots [of youth violence]” (McMurtry & Curling, 2008, p. 18). The HYPE program was developed as part of this responsive strategy.

Since its inception, the primary objective of HYPE has been both to familiarize youth from underserved neighbourhoods with academic programs and services while also facilitating relationships and mentorships. HYPE functions with an eye to supporting its participants’ academic success, should they ultimately decide to enter PSE, whether at Centennial College or another postsecondary institution. Using a relational engagement model, this is achieved by:

- Reducing as many identified barriers to postsecondary involvement as possible
- Providing an on-campus, postsecondary learning experience
- Establishing and maintaining relationships with staff and mentors to support participants through to the completion of their postsecondary education (Centennial College, 2013)³

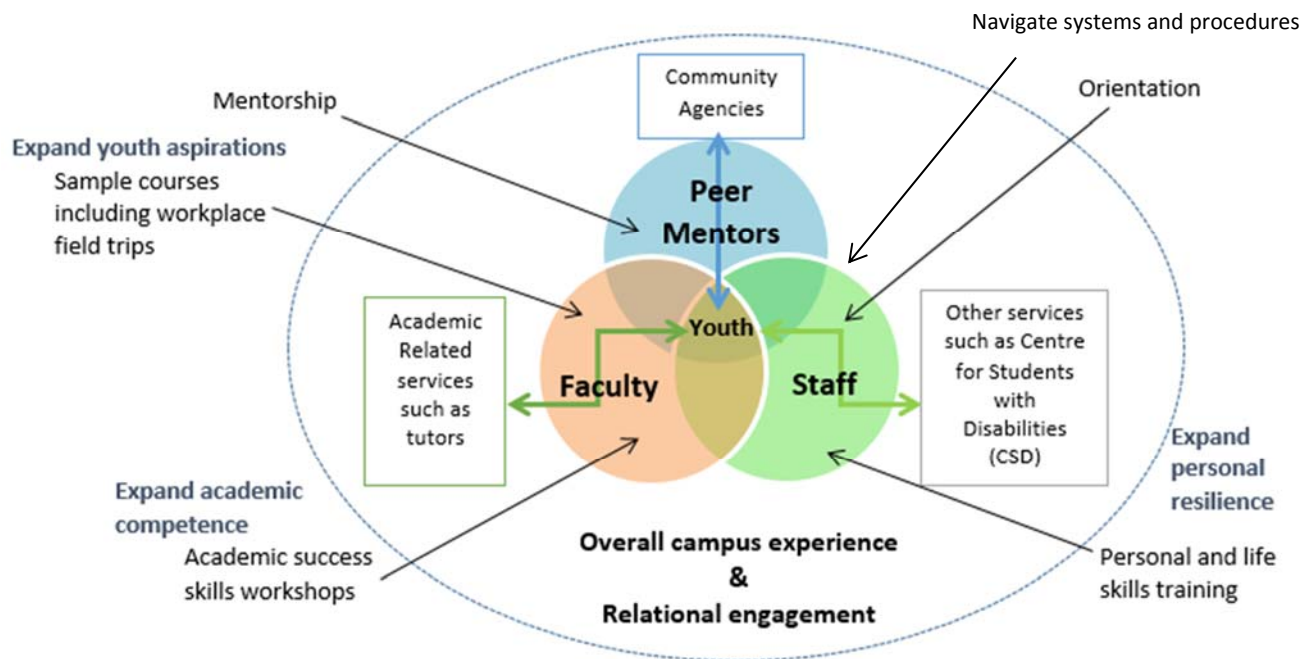
The relational engagement model integrates a broad range of stakeholders, drawn from both the college and the community to provide a comprehensive service that includes modeling successful behaviour, early

² With the emergence of the Toronto Strong Neighbourhoods Strategy in 2014, the term Priority Investment Neighbourhoods was replaced with Neighbourhood Improvement Areas (NIA).

³ A discussion of how HYPE and its components fit within the broader discussion of engagement, intervention, support and student outreach can be found in the Appendix.

identification of issues that could affect student success (within both the college and the community) and resolution strategies for these issues. Figure 1 depicts the program components and the relational engagement model.

Figure 1: HYPE Components and the Relational Engagement Model



In addition, human resources were utilized in the provision of the HYPE program in the form of:

- Faculty with expertise in regular program development and delivery at the college, and optimally, experience in working with underserved populations
- Program staff — drawn from those with outreach skills in the local community — who worked in a coordinated way to provide one-on-one support to participants
- Peer mentors — drawn from HYPE program graduates — who had surmounted many of the barriers of the current cohort of program participants

Program resources included:

- Referrals to and support with using college services such as the Centre for Students with Disabilities
- Individualized attention in the form of engagement and advocacy on student financial assistance
- Encouragement and confidence building around personal coping skills and meeting college admission requirements.

Furthermore, as much as possible, staff, faculty and peer mentors were recruited with a view to how they would serve as role models for participants.

Program Structure and Delivery

About half (50%–55%) of applicants connect with the program through word of mouth and there are typically over 100 people on a waiting list for one of a possible 180 spots before the on-line application system is even activated. Youth who are 17–29 years of age and who live in Neighbourhood Improvement Areas (NIAs) are eligible to apply on-line for this six-week on-campus learning experience. Applicants identify their three preferences to select one course — from among seven course options representing each of Centennial’s academic schools — for which students receive a Centennial College continuing education credential upon graduation. In addition, motivational and skill-development workshops are offered weekly, as is an academic skills preparation course for those inclined to full-time study. Faculty are hired through the college, as are student mentors. The peer mentors are generally graduates of a previous HYPE cohort who have had successful experiences at the college. During formal classes peer mentors act as teaching assistants, monitoring participants who may be having difficulty with the academic content and troubleshooting some of the less complex discipline issues. Outside of class hours they are expected to act as links or liaisons with Outreach Office staff, identifying and encouraging participants to seek help. Like most others involved in program delivery, peer mentors are expected to act as role models for the program participants. To support peer mentors financially, the college takes advantage of the Ontario government’s Work Study program, which provides a stipend for up to 24 hours a week for students in need.

HYPE is tuition free and provides breakfast, lunch, transit and all learning materials free-of-charge. Upon graduation, an entry and a returner bursary are available for those who decide to enter full-time study at Centennial and demonstrate financial need. Typically, 86% of participants graduate from the program and 33%–50% of graduates enter full-time study at Centennial College each year. Assistance with applications for full-time study is provided by college staff. A recent phenomenon has seen graduates from past cohorts (between eight and 14 per year), who did not enter full-time study in the year of their graduation, return as many as six years later, to enrol in full-time study.

The Summer Experience curriculum is structured to provide program participants with exposure to a sample of the content — totaling 72 hours — they might see if they actually enrolled in a college program (four hours a day, three days per week for six weeks). The focus is on youth engagement and the transformation and/or consolidation in their belief in themselves as learners and their belonging in postsecondary education, with a secondary focus on content acquisition. Faculty are selected from among regular Centennial College faculty so they have already been vetted for competency by their respective school or department. In the 72 hours available, faculty typically attempt to focus on some generic content in combination with one or two live projects. For example, faculty may elaborate on the health and safety considerations for the practice of a given occupation, followed by a couple of basic spa treatments in aesthetics, or an oil change or brake inspection in auto mechanics. As resources permit, faculty are encouraged to facilitate field visits to an actual job site so that participants get a chance to observe workers in action and ask questions.

Additionally, from 2014–16, HYPE Works was developed within the HYPE experience, as an alternate exit strategy (to direct postsecondary admission) and focuses on increased employability and job-readiness skills. HYPE Works facilitates employment and maintains engagement with youth not currently in a position to enter PSE.

HYPE Graduates Profile

Since 2011 just under 600 individuals have participated in the HYPE program with 501 successfully completing the program.

Table 1: HYPE Participation and Completion Rates

| | HYPE year | | | | | Total |
|---|-----------|------|------|------|------|-------|
| | 2011 | 2012 | 2013 | 2014 | 2015 | |
| HYPE participants | 69 | 134 | 131 | 121 | 134 | 589 |
| # HYPE completions | 56 | 119 | 103 | 101 | 122 | 501 |
| HYPE completion % | 81 | 89 | 79 | 84 | 91 | 85 |
| Completed HYPE & registered at Centennial | | | | | | |
| In progress | 1 | 5 | 7 | 14 | 25 | 52 |
| Completed | 5 | 20 | 9 | 5 | 4 | 43 |
| Withdrew | 19 | 18 | 21 | 27 | 12 | 97 |

Table 1 shows that the program has ranged from 69 to 134 participants and its completion rate has similarly ranged from roughly 79% to a high of 91% in 2015. Table 1 also breaks down the situation for those from each cohort who finished HYPE who then entered Centennial as college students and how they have fared. The rate of program completion in college does not flow automatically from completing the HYPE program. A type of “funnel” effect is evident as fewer and fewer individuals successfully reach each major milestone. Thus, starting with the decision to enter HYPE, the number of participants decreases, in each cohort, in terms of completing HYPE, deciding to enter college, then completing college studies.

Methodology

This study employed a quantitative approach, supplemented with the results of a qualitative analysis, to comprehensively evaluate the effect of HYPE program completion with an eye to creating a broader best-practice approach to research to be used for broader dissemination. Our research addressed the following questions:

- What are the student level predictors of participating in the HYPE program at Centennial College?
- What are the differences in students’ performance among key indicators (persistence, graduation and academic performance) and do they vary according to participation in the HYPE program?

We anticipate that the HYPE program will have a positive overall effect on student performance on “model route” benchmarks. However, as a point of caution, we must state that the findings of this research are not an indication of the HYPE program in terms of its own stated objectives (access to PSE and the development of life skills). Rather it is an evaluation of the additional benefits that HYPE may offer for students.

In what follows we describe the data used for analysis and we outline the propensity score matching technique that was used to create a control group for analysis. This leads us to address a final research question:

- How effective is propensity score matching as a framework for evaluating a program as unique as HYPE?

Ethics approval was obtained through the Research Ethics Board.

Key Informant Interview Data

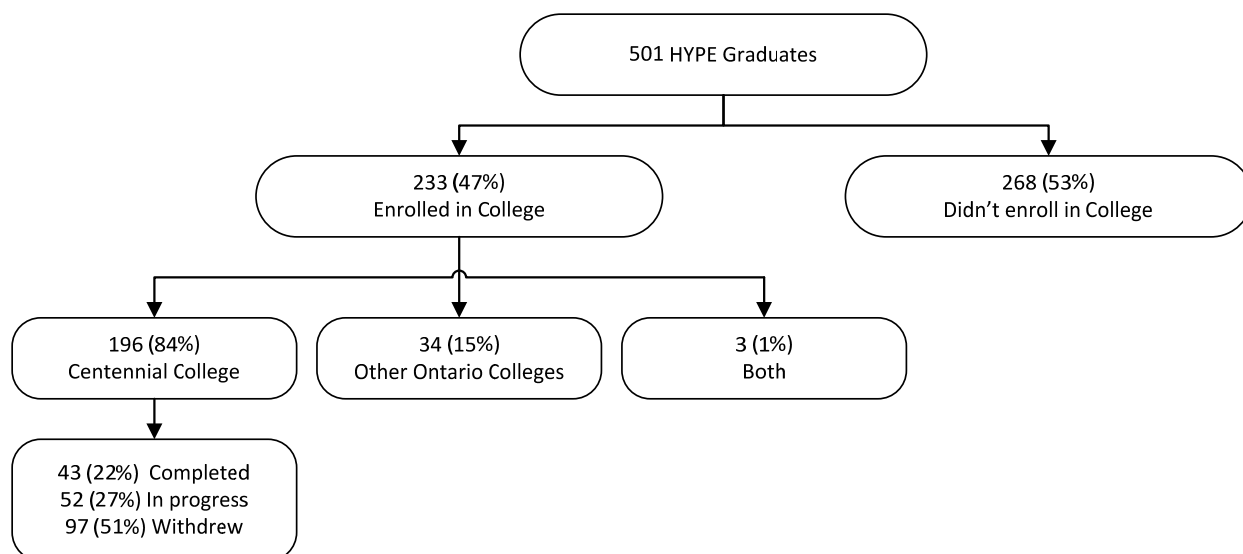
In an effort to build on the insights learned from previous interviews with HYPE students (Maher & Bertin, 2013), we performed 30-minute telephone interviews with 12 informants who were involved in the HYPE program as faculty, staff or peer mentors. Discussions revolved around design and delivery of the HYPE curriculum, participant interests and expectations, and a description of typical participants and how they are served by the program. The results were then reviewed and thematized to aid in our understanding of the HYPE population and to give meaning to our quantitative results.

Data and Variables for Propensity Score Matching

Sample

The dataset was compiled by linking HYPE tracking files with Centennial’s administrative data using a Centennial student number, which is provided to all students upon admission to the program. This linkage gave us access to a wide range of data including additional demographic information, high school average and progression through Centennial programs, as well as the ability to identify HYPE graduates who pursued a college education. Furthermore, the administrative data available at Centennial allowed us to capture some of the 2011 census data using the first three characters of HYPE graduates’ residential postal codes. This linkage provided important information about students’ neighbourhood characteristics such as designation, employment status of the sub-population, percentage of the population who are visible minorities and percentage of lone-parent families in the neighbourhood. We started by performing significance testing on the mean differences in demographic and academic attributes between HYPE graduates who went to college and those who did not. The purpose of this part of the analysis was to determine the factors that correlated with students’ decision to pursue a postsecondary education. Figure 2 summarizes the HYPE graduates’ pathways to college education.

Figure 2: HYPE Graduates' Pathways, 2011–2015



Between 2011 and 2015, a total of 233 (47%) HYPE program graduates enrolled in college with the majority (84%) continuing at Centennial College. An additional 15% enrolled at another Ontario college while the remaining 1% enrolled at both Centennial College and another Ontario college. To date, 22% of those who completed HYPE have graduated from Centennial with a college-level credential.

Our final sample consisted of 184 HYPE students and 11,936 Non-HYPE students who enrolled at Centennial between 2011 and 2015. Table 2 shows the distribution of HYPE and non-HYPE students by academic year.

Table 2: Total Number of Students Included in the Study by Intake Year

| | 2011 | 2012 | 2013 | 2014 | 2015 | Total |
|--------------|-------|-------|-------|-------|-------|--------|
| Non-HYPE | 1,961 | 2,527 | 2,605 | 2,452 | 2,391 | 11,936 |
| HYPE | 11 | 30 | 52 | 37 | 54 | 184 |
| Total | 1,972 | 2,557 | 2,657 | 2,489 | 2,445 | 12,120 |

Demographic Information

This section explores the profile of HYPE graduates and the differences in demographic and academic attributes between HYPE graduates who continued onto college and those who did not. T-tests and Chi-square tests were used to identify whether statistically significant differences existed between categories. Of note, Table 3 shows that 56% of HYPE graduates were female and that they were more likely to enrol in college than their male counterparts (53% versus 38% respectively). HYPE graduates had a median age of

21–25 and there were no statistically significant differences for college enrolment among age groups. A large proportion (63%) of HYPE graduates were the first in their family to attend a postsecondary educational institution (first generation)⁴ and 8% identify as Indigenous.⁵

Table 3: Demographic Characteristics of Those who Completed HYPE

| Independent Variables | | N | % | Enrolled in College | | Significance Level |
|-----------------------|--------------|-----|-------|---------------------|-----|--------------------|
| | | | | No | Yes | |
| Gender | Female | 280 | 56% | 47% | 53% | * |
| | Male | 221 | 44% | 62% | 38% | |
| Age | Less than 21 | 41 | 8% | 54% | 46% | NSD |
| | 21–25 | 243 | 49% | 53% | 47% | |
| | 26–30 | 157 | 31% | 54% | 46% | |
| | 31–35 | 58 | 12% | 53% | 47% | |
| | More than 35 | 2 | .003% | 100% | 0% | |
| First Generation | No | 126 | 37% | 48% | 52% | ** |
| | Yes | 216 | 63% | 58% | 42% | |
| Crown Ward | No | 216 | 91% | 53% | 47% | NSD |
| | Yes | 21 | 9% | 38% | 62% | |
| Indigenous | No | 216 | 92% | 53% | 47% | NSD |
| | Yes | 19 | 8% | 42% | 58% | |
| Francophone | No | 215 | 95% | 53% | 47% | NSD |
| | Yes | 11 | 5% | 27% | 73% | |

*significant at p<0.05

** significant at p<0.1

NSD: no significant difference

Academic Traits

Table 4 presents significance testing of the differences in academic-related variables for HYPE graduates. HYPE graduates who enrolled in college have, on average, a higher English grade in high school (69%) than graduates who did not enrol (62.9%). Only 36% of graduates who had previously completed less than high school continued their PSE compared to 57% of high school graduates and 43% of PSE grads. Those who attended at least 16 of the 18 course days were more likely to enrol in college after HYPE graduation, another difference that was statistically significant.

4 This compares to 43% at Centennial College and 33% at other Ontario Colleges (2015–16 KPI Student Satisfaction Survey - Centennial College; 2015 Environmental Scan, Student and Graduate Profile, Ontario College).

5 This compares to 2% at Centennial College and other Ontario Colleges (2015–16 KPI Student Satisfaction Survey - Centennial College; 2015 Environmental Scan, Student and Graduate Profile, Ontario College).

Table 4: Academic Attributes of Those Who Completed the Hype Program

| Independent Variables | | N | % | Enrolled in College | | Significance Level |
|--------------------------------------|-------------------------------|-----|-----|---------------------|--------|--------------------|
| | | | | No | Yes | |
| High school – English grade | Grades | 117 | | 62.96 | 68.977 | * |
| | Less than high school | 186 | 40% | 64% | 36% | * |
| Highest level achieved | High school | 211 | 45% | 43% | 57% | |
| | Postsecondary education (PSE) | 72 | 15% | 57% | 43% | |
| HYPE program attendance ⁸ | Below 16 days | 137 | 42% | 61% | 39% | * |
| | Equal to or above 16 days | 189 | 58% | 48% | 52% | |
| HYPE previous participation | Previous HYPE | 22 | 4% | 41% | 59% | NSD |
| | New HYPE | 479 | 96% | 54% | 46% | |

*significant at p<0.05

** significant at p<0.1

NSD: no significant difference

Table 5 shows the relative distribution of HYPE students by sample college program and whether any significant difference exists in terms of college enrolment. Overall, 47% of those who completed HYPE continued their college education, however the decision to enrol in college differs by program. Students who completed HYPE enrolled predominantly in the Human Development and Business & Entrepreneurship programs. It is worth noting that programs are offered in various years and that the Business & Entrepreneurship and the Human Development programs each have two sections per year while other programs only offer one section per year. However, up to 60% of HYPE graduates who took Human Development courses pursued college education compared to only 39% from Business & Entrepreneurship courses. By contrast, trade programs like Automotive and Baking attracted fewer participants with about 30%–40% of them deciding to enrol in college. The rest of the programs showed a fairly even distribution between HYPE participants who enrolled in college and those who did not.

Table 5: HYPE Participation in Sample College Program

| Sample College Program | N | % | Enrolled in College | | Significance Level |
|-----------------------------|-----|-----|---------------------|-----|--------------------|
| | | | No | Yes | |
| Automotive | 43 | 9% | 70% | 30% | * |
| Baking | 45 | 9% | 69% | 31% | * |
| Business & Entrepreneurship | 118 | 24% | 61% | 39% | ** |
| Esthetics | 62 | 12% | 50% | 50% | NSD |
| Food Services | 10 | 2% | 50% | 50% | NSD |

6 This cell refers to the high school average in English for the HYPE participants who did not enrol in College.

7 This cell refers to the high school average in English for the HYPE participants who enrolled in College.

8 Program attendance is measured in relation to the median days of attendance.

| Sample College Program | N | % | Enrolled in College | | Significance Level |
|------------------------|------------|-------------|---------------------|------------|--------------------|
| | | | No | Yes | |
| Green Energy | 5 | 1% | 40% | 60% | NSD |
| Human Development | 154 | 31% | 40% | 60% | * |
| Information Technology | 35 | 7% | 51% | 49% | NSD |
| Digital Media | 22 | 4% | 59% | 41% | NSD |
| Office Administration | 7 | 1% | 57% | 43% | NSD |
| Total | 501 | 100% | 53% | 47% | |

*significant at p<0.05

** significant at p<0.1

NSD: no significant difference

Table 6 investigates how HYPE course selection is related to program registration for those who decided to pursue a college education at Centennial. The comparison shows that those who took courses in Business & Entrepreneurship and the Human Development program were the most likely to select the same major when enrolling at Centennial while those who took Information Technology courses were the least likely to enrol in a similar college program.

Table 6: Number of Students that Completed HYPE and Enrolled in a Similar College Program

| Sample College Program | Enrolled at Centennial College | Enrolled in Program Similar to HYPE Sample Courses | |
|-----------------------------|--------------------------------|--|-------|
| | | N | % |
| Automotive | 11 | 4 | 36.4% |
| Baking | 12 | 4 | 33.3% |
| Business & Entrepreneurship | 38 | 30 | 78.9% |
| Esthetics | 29 | 16 | 55.2% |
| Food Services | 3 | 1 | 33.3% |
| Green Energy | 3 | 1 | 33.3% |
| Human Development | 75 | 54 | 72.0% |
| Information Technology | 15 | 3 | 20.0% |
| Digital Media | 8 | 3 | 37.5% |
| Office Administration | 5 | 2 | 40.0% |

Neighbourhood Characteristics

The administrative data available at Centennial allowed us to capture 2011 census data for the city of Toronto by using the first three digits of HYPE graduates’ residential postal codes, and provided neighbourhood data not included in college student records. All Toronto neighbourhoods can be classified as one of three main “designation areas” according to the Toronto Strong Neighbourhoods Strategy 2020 (TSNS).⁹ Neighbourhood Improvement Areas (NIAs) require more investment to improve their well-being; Emerging Neighbourhood refers to neighbourhoods that witnessed improvements in various traits; and the rest of Toronto’s neighbourhoods are classified as No Designation. Table 7 shows that 43% of HYPE graduates were living in Neighbourhood Improvement Areas, however, Chi-square testing showed no statistically significant difference in college enrolment among inhabitants of the three designation areas.

Table 7: Percentage of HYPE Students Living in TSNS Designation Areas

| TSNS Designation | Enrolled in College | | Total | |
|--|---------------------|-----|-------|------|
| | No | Yes | | |
| Neighbourhood Improvement Areas (NIAs) | 53% | 47% | 196 | 43% |
| Emerging Neighbourhood | 50% | 50% | 78 | 17% |
| No Designation | 55% | 45% | 178 | 39% |
| Total | 53% | 47% | 452 | 100% |

Table 8 presents 2011 census data for the HYPE graduates compared with that of the City of Toronto. The analysis shows no statistically significant differences in college enrolment across various socioeconomic indicators. However the intersection of gender (female) with the visible minority status shows a statistically significant difference.

⁹ City of Toronto, www.toronto.ca/tsns2020

Table 8: Percentage of Population by Various Sociodemographic Indicators for City and the Neighbourhood of Those who Completed HYPE (2011 census data)

| Percentage of Population | City of Toronto ¹⁰ | HYPE Graduates | Enrolled in College | |
|--|-------------------------------|----------------|---------------------|--------|
| | | | No | Yes |
| Born in Canada | 51% | 43.3% | 43.3% | 43.3% |
| No certificate | 11% | 12.8% | 13.0% | 12.7% |
| High school | 21% | 25.6% | 25.5% | 25.7% |
| Postsecondary education | 69% | 61.6% | 61.5% | 61.6% |
| Participation rate ¹¹ | 64% | 61.2% | 61.1% | 54.2% |
| Neighbourhood unemployment rate | 9% | 11.5% | 11.4% | 11.7% |
| Visible minority ¹² | 49% | 66.1% | 65.6% | 66.6% |
| Visible minority * female | - | 65.2% | 63.2% | 66.8%* |
| % of all families that are female lone-parent families | 17.9% | 20.4% | 20.3% | 20.5% |
| % of all families with children that are lone-parent female families | 26.9% | 33.1% | 33.1% | 33.1% |
| % of population in private households in a low-income situation | 19.3% | 21.2% | 21.2% | 21.1% |
| % of population under age 18 in private households in a low-income situation | 25.1% | 29.1% | 28.9% | 29.2% |

*significant at $p < 0.05$
Source: 2011 Census data

** significant at $p < 0.1$

NSD: no significant difference

Dependent Variables

The impacts of participation in the HYPE program are measured by three different college outcomes that are used as dependent variables in our study: program complete/in progress, persistence and academic performance. Completed/in progress is based on a three-level categorical variable that measures whether students have completed their program. We recoded the three levels into a binary variable grouping “successful” and “in progress” students together ($Y=1$) and opposed it to those who left college after being

¹⁰ City of Toronto, http://www1.toronto.ca/city_of_toronto/social_development_finance_administration/files/pdf/nhs_backgroundunder.pdf

¹¹ The percentage of the population 15 and over that is either working or actively looking for work (Reference: http://www.rbc.com/economics/economic-reports/pdf/other-reports/Canada_participation_rate.pdf)

¹² 28% of students at Ontario colleges in 2016 identified as being a visible minority.

enrolled for at least one term ($Y=0$). First-year persistence is a binary outcome measuring whether a student persisted beyond the first year of her/his program ($Y=1$) or not ($Y=0$). Finally, “Intake GPA” stands for the student’s GPA in his/her first semester at Centennial College. This variable was similarly recoded into a binary format with those students who earned grades between “A” and “C” being classified as 1 while students who got a “D” or an “F” being coded as 0.

Propensity Score Matching

The HYPE program is comprised of individuals who volunteered to participate and who meet certain requirements. In this respect, it may be said that our sample was heavily burdened by selection bias. Any attempt to examine the impact of HYPE participation had, therefore, to deal with this bias to ensure that what we measured were student outcomes caused by program participation and not by factors that led to differential inclusion in the program in the first place. We employed a method that attributes causality to the treatment itself and not to factors that lead to the treatment (May et al., 2013). Put differently, propensity score matching is used to reduce the bias in the estimation of treatment effects within the observational data set (Becker, 2002). To accomplish this we used the propensity score matching (PSM) technique to examine the probability of participating in the HYPE program given covariates of interest by creating a control group of individuals who have similar characteristics (and propensities to participate in a program like HYPE) against which HYPE participants can be compared. In this way our analysis can be sure to produce results attributable to the treatment itself and not to an underlying difference in the population that causes differential membership in the program in the first place.

The procedure for addressing the research questions involved four main steps:

Step 1: This step of the analysis involved developing a multiple logistic regression model predicting HYPE participation based on all available student and school-level variables. The primary function of this model was to produce propensity score estimates that identified the probability of each student enrolling in the HYPE program. Thus, the outcome at this stage was the propensity score of participation in HYPE to be used in the matching process in the next steps.

Step 2: The propensity scores were used to assess and correct observed selection bias among the levels of student characteristics. The estimated scores were compared for HYPE and non-HYPE students through visual inspection of density plots and then used to create a matched group of non-HYPE students with nearly identical propensity scores to HYPE participants. The matching process was implemented using full-match nearest neighbour matching technique (with replacement). This technique matched control individuals (non-HYPE students) to the treated group (HYPE graduates) in terms of the similarity of their propensity score. Each HYPE student was linked to at least one non-HYPE student and controls who were not selected as matches were removed from the sample. This technique allowed for the usage of the full sample instead of matching only a subset of students (Becker & Ichino, 2002).

Step 3: After we calculated propensity scores and performed the matching technique we evaluated the effectiveness of this matching by comparing the covariate mean bias before and after matching and building a model that best performed in terms of bias reduction. A combination of four models was used to estimate

the effect of the HYPE program for each of the dependent variables. Table 9 shows the independent (predictor) variables included in each of the four models that were tested.

- Model 1: This is our first model and it includes all demographic, neighbourhood socioeconomic indicators, previous academic performance and college-related measures such as intake year, English placement test and program length. The matching process using this model resulted in 46 HYPE graduates matched with 5,288 non-HYPE students with each group having nearly identical characteristics.
- Model 2: The matching process in model 1 produced a small sample with only 46 HYPE graduates. Thus, fitting this second model allowed us to compensate for the large number of missing values of high school average for both the control (HYPE) and the comparison (Non-HYPE) study groups. A total of 119 HYPE students were matched with 5,714 non-HYPE students.
- Model 3: This model includes a sample of Centennial students where high school average and previous academic credentials were not available. This model parallels an important characteristic of HYPE participants as a large number of them have no high school diploma. The propensity matching process using the predictors in this model resulted in 62 HYPE students being matched with 257 non-HYPE students.
- Model 4: This model omits the same variables as Model 3 and also omits all Level 2 variables other than the Toronto Neighbourhood Designation.¹³ We argue that the TSNS designation sufficiently encapsulates the remaining neighbourhood calculations and thus they add little to the model. Model 4 is comprised of 119 HYPE participants and 568 non-HYPE students.

Step 4: The final step was to estimate the average effect of treatment on the treated (ATT), which represents the difference between the outcomes of the treated units and the outcomes of the matched control units (Becker, 2002). Causality at the individual level is impossible to calculate as no individual can both receive and not receive the treatment of interest. Therefore, the ATT is a measure of the average of the effect for those individuals who received the treatment (Chen, 2014). The difference between the outcomes of HYPE students and the outcomes of the non-HYPE students reflects the effect of participating in the HYPE program on the HYPE participants' outcomes.

¹³ In this study level 2 variables correspond to neighbourhood characteristics whereas level 1 variables are at the individual level.

Table 9: List of Variables Included in the Propensity Matching in Four Different Models

| Student Predictors | Model 1 | Model 2 | Model 3 | Model 4 |
|--|----------------|----------------|----------------|----------------|
| Gender | YES | YES | YES | YES |
| Age | YES | YES | YES | YES |
| First generation status | YES | YES | YES | YES |
| Previous education | YES | YES | - | - |
| TSNS designation | YES | YES | YES | YES |
| % of neighbourhood born in Canada | YES | YES | YES | - |
| % of neighbourhood with PSE | YES | YES | YES | - |
| Neighbourhood unemployment rate | YES | YES | YES | - |
| % of neighbourhood that are lone-parent families | YES | YES | YES | - |
| Intake year | YES | YES | YES | YES |
| English test score | YES | YES | YES | YES |
| Program length | YES | YES | YES | - |
| High school average | YES | - | - | - |
| # of non-HYPE/# of HYPE | 5288/46 | 5714/119 | 257/62 | 568/119 |

Findings

Predictors of HYPE Participation

The results of the bivariate and multivariate odds ratios and the descriptive statistics of student level predictors are shown in Table 10. The outcomes of the analysis show that female students were about two times (1.951 times) more likely than male students to participate in the HYPE program. The age group categories show that HYPE students were more likely to be mature students when compared to non-HYPE students. First generation educational status was highly predictive of participation in HYPE as these students were two times more likely to be in the HYPE program compared to other Centennial students. Previous education was also highly predictive of HYPE participation as having previous education was associated with lower odds of participating in HYPE.

Table 10: Bivariate and Multivariate Odds Ratios for Student Predictors of Participation in the HYPE Program

| | Student Predictors | N | Bivariate Odds Ratios | Multivariate Odds Ratio (5,334) | Non-HYPE % | HYPE % |
|-------------------------|---|--------|-----------------------|---------------------------------|------------|--------|
| Gender | Female | 12,109 | 1.951*** | 3.724*** | 47.8 | 64.7 |
| Age | Less than 21 (reference group) | | - | - | 35.9 | 12.8 |
| | 21–25 | | 2.155 | - | 31.2 | 23.5 |
| | 26–30 | 12,117 | 4.992 | 1.515 | 25.7 | 44.8 |
| | 31–35 | | 7.15 | 1.16 | 7.2 | 18 |
| | More than 35 | | (omitted) | 2.543 | 0 | 1.1 |
| First Generation Status | Yes | 9,420 | 2.087*** | 0.721 | 60 | 41.8 |
| Previous Education | Yes | 12,119 | 0.151*** | 0.843 | 80.1 | 37 |
| TSNS Designation | Neighbourhood Improvement Areas (reference group) | | - | - | 54.2 | 40 |
| | Emerging Neighbourhood | 7,830 | 0.929 | 1.472 | 13.1 | 18.1 |
| | No Designation | | 0.534 ** | 0.35 | 32.7 | 41.9 |
| Socioeconomic | % of Neighbourhood born in Canada | | 0.484 | 6.094 | 44.4 | 43.5 |
| | % of Neighbourhood with PSE | 7830 | 0.263 | 0.161 | 63 | 62.1 |
| | Unemployment Rate | | - | 0 | 10.9 | 11.7 |
| | % of Neighbourhood that are lone-parent families | | - | 0.0284 | 23 | 24 |
| Intake Year | 2011 (reference group) | | - | - | 16.43 | 5.98 |
| | 2012 | | 2.116 | 0.821 | 21.17 | 16.3 |
| | 2013 | 12,120 | 3.559 | 2.958 | 21.82 | 28.26 |
| | 2014 | | 2.69 | 2.492 | 20.03 | 20.11 |
| | 2015 | | | 5.915 ** | 20.54 | 29.35 |
| English Test Score | 130 (reference group) | | - | - | 1.04 | 0.55 |
| | 140 | | 4.026 | 1 (empty) | 9.32 | 14.75 |
| | 160 | 12,119 | 3.008 | 1.424 | 48.53 | 56.28 |
| | 170 | | 2.205 | 0.822 | 41.09 | 28.42 |
| | 180 (omitted) | | 1.315 | 1 (omitted) | 0.01 | 0 |
| Program Length | 2 Semesters (reference group) | 12,120 | - | - | 11.67 | 13.59 |
| | 3 Semesters | | 0.567 | 1.345 | 3.29 | 2.17 |

| Student Predictors | N | Bivariate Odds Ratios | Multivariate Odds Ratio (5,334) | Non-HYPE % | HYPE % | |
|---------------------|---------------------|-----------------------|---------------------------------|------------|--------|--------|
| 4 Semesters | | 0.991 | 1.698 | 53.7 | 61.96 | |
| 5 Semesters | | 4.286 | - | 0.11 | 0.54 | |
| 6 Semesters | | 0.557 | 1.165 | 20.12 | 13.04 | |
| 9 Semesters | | 0.672 | 1.833 | 11.11 | 8.7 | |
| High School Average | High school average | 9,693 | 0.973* | 0.987 | 73.303 | 68.692 |

Note: *p<.05, **p<.01, ***p<.001

Students from Emerging Neighbourhoods or neighbourhoods labelled No Designation were less likely to participate in HYPE compared to students from Neighbourhood Improvement Areas. Students coming from a neighbourhood with a high percentage of lone-parent families were more likely to participate in the HYPE program, yet this variable was moderately predictive of HYPE participation. Another neighbourhood characteristic that was weakly predictive of HYPE participation is percentage of the neighbourhood population born in Canada. A one standard deviation increase in the percentage of the population born in Canada was associated with a 51.6% (100% – 48.4%) decrease in the odds of participating in HYPE. Similarly, a one standard deviation increase in the percentage of population with postsecondary education was associated with a 73.6% (100% – 26.3%) decrease in the odds of participating in HYPE. Other variables that were weakly predictive of HYPE participation include English test score and total program length. Finally, high school average was moderately predictive of HYPE participation. HYPE participants were more likely to have a lower high school average compared to non-HYPE students.

The outcomes of the multivariate model are also included in Table 10, which shows that the total sample size was reduced to 5,334 due to missing values among the predictors. The interpretation of the multivariate model parameters for individual predictors is difficult given the high degree of confounding and multicollinearity between predictors. Many of the predictors that were significant in the bivariate models are now insignificant in the multivariate model. Nonetheless, the main purpose of this model is not to interpret coefficients for specific variables, but to maximize the predictive power for explaining who does and does not participate in the HYPE program (Rosenbaum & Rubin, 1983; Rosenbaum, 2002; Rubin, 2004, as cited in May et al., 2013). Thus, collinearity and unstable coefficients are not an issue since including as many predictors as available improves the accuracy of the predictions (Rosenbaum, 2002, as cited in May et al., 2013).

Propensity Score Matching Results

The propensity scores from the multiple logistic regression model were used as estimates of the probability that each student would participate in HYPE. The estimated propensity scores were compared for HYPE and non-HYPE students through visual inspection of density plots. As explained earlier in this section, four different models were used to understand the effect of the HYPE program on participants' college outcomes. As the goal of propensity score matching is to create a control group whose members' characteristics closely resemble those of the treatment group, we employed the STATA program ptest to

determine the extent to which we were effective (Leuven & Sianesi, 2003). Table 11 provides the covariate mean bias reduction for the treatment and control group for the four models before and after matching.

Table 11: Bias in Covariate Means Before and After Matching

| Variable | Matched / Unmatched | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|-----------------------------|---------------------|---------|----------|---------|----------|---------|----------|---------|----------|
| | | % bias | % reduct | % bias | % reduct | % bias | % reduct | % bias | % reduct |
| High school average | U | -37.9 | | | | | | | |
| | M | 16.3 | 56.9 | | | | | | |
| First generation status | U | 36.9 | | 36.9 | | 36.9 | | 36.9 | |
| | M | -9 | 75.6 | 10.2 | 72.3 | -3.4 | 90.7 | -1.7 | 95.4 |
| Gender | U | 33.3 | | 33.3 | | 33.3 | | 33.3 | |
| | M | 0 | 100 | -15.4 | 53.6 | 0 | 100 | -13.7 | 58.8 |
| Age group 19–20 | U | -17.3 | | -17.3 | | -17.3 | | -17.3 | |
| | M | -10 | 42.1 | 1.9 | 89.1 | 1.9 | 89 | -3.8 | 78.1 |
| Age group 21–25 | U | 40.8 | | 40.8 | | 40.8 | | 40.8 | |
| | M | 19 | 53.6 | 14.3 | 64.9 | 5.4 | 86.7 | 1.8 | 95.6 |
| Age group 26–30 | U | 33 | | 33 | | 33 | | 33 | |
| | M | 0 | 100 | -5.1 | 84.5 | 10.3 | 68.7 | 0 | 100 |
| Age group 31+ | U | 14.8 | | 14.8 | | 14.8 | | 14.8 | |
| | M | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 |
| Intake year 2012 | U | -12.5 | | -12.5 | | -12.5 | | -12.5 | |
| | M | 0 | 100 | 4.3 | 65.5 | 13 | -4.5 | 0 | 100 |
| Intake year 2013 | U | 14.9 | | 14.9 | | 14.9 | | 14.9 | |
| | M | -5.1 | 65.5 | 11.7 | 21.7 | 7.8 | 47.3 | 1.9 | 86.9 |
| Intake year 2014 | U | -1.1 | | -1.1 | | -1.1 | | -1.1 | |
| | M | 0 | 100 | 10.4 | -867.7 | -14.7 | -1266.2 | 2.1 | -93.5 |
| Intake year 2015 | U | 21.7 | | 21.7 | | 21.7 | | 21.7 | |
| | M | -10.4 | 52.3 | -19.6 | 9.8 | -9.9 | 54.5 | -2 | 91 |
| Program length: 3 semesters | U | -6.9 | | -6.9 | | -6.9 | | -6.9 | |
| | M | 13.6 | -98.7 | 5.2 | 24.9 | -5.2 | 24.2 | 10.3 | -50.2 |
| Program length: 4 semesters | U | 16.7 | | 16.7 | | 16.7 | | 16.7 | |
| | M | 9 | 46.2 | 10.2 | 38.9 | -15.5 | 7.6 | -5.1 | 69.5 |
| Program length: 5 semesters | U | 7.6 | | 7.6 | | 7.6 | | 7.6 | |
| | M | 0 | 100 | 14.7 | -93.4 | 0 | 100 | 0 | 100 |
| Program length: 6 semesters | U | -19.1 | | -19.1 | | -19.1 | | -19.1 | |
| | M | -6 | 68.6 | -13.6 | 28.7 | -2.3 | 88 | -2.3 | 88.1 |
| Program length: 9 semesters | U | -8.1 | | -8.1 | | -8.1 | | -8.1 | |
| | M | -14.9 | -84.1 | -2.8 | 65.2 | 14.2 | -75.6 | 2.8 | 65.2 |
| English test score 140 | U | 16.7 | | 16.7 | | 16.7 | | 16.7 | |
| | M | -6.8 | 59.1 | -5.2 | 69 | -5.2 | 68.8 | -5.2 | 69 |
| English test score 160 | U | 15.5 | | 15.5 | | 15.5 | | 15.5 | |
| | M | -4.5 | 71.3 | 13.5 | 13.3 | 1.7 | 89.1 | 5.1 | 67.5 |
| English test score 170 | U | -26.8 | | -26.8 | | -26.8 | | -26.8 | |
| | M | 9.4 | 64.9 | -10.7 | 60.2 | 1.8 | 93.3 | -1.8 | 93.4 |

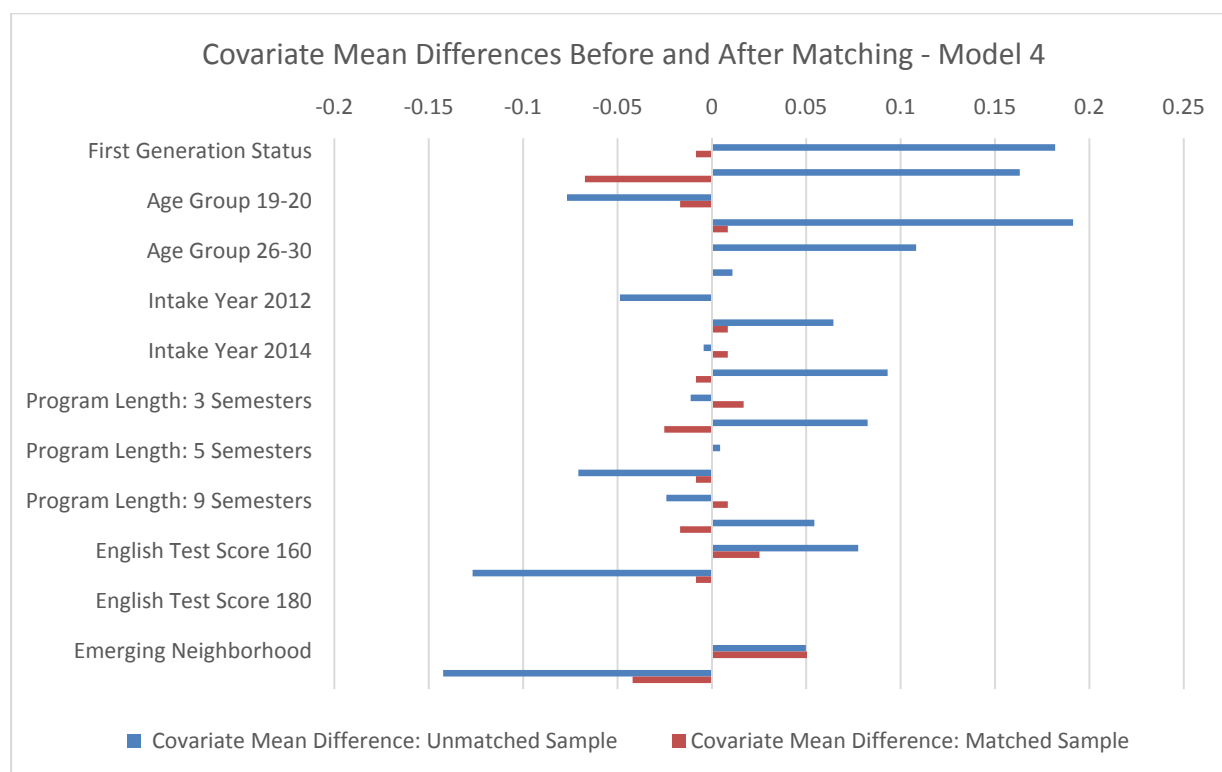
| Variable | Matched / Unmatched | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|--|---------------------|---------|----------|---------|----------|---------|----------|---------|----------|
| | | % bias | % reduct | % bias | % reduct | % bias | % reduct | % bias | % reduct |
| English test score 180 | U | -1.3 | | -1.3 | | -1.3 | | -1.3 | |
| | M | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 |
| Previous education | U | -95.3 | | -95.3 | | | | | |
| | M | 5 | 94.8 | 7.6 | 92.1 | | | | |
| Emerging neighbourhood | U | 13.7 | | 13.7 | | 13.7 | | 13.7 | |
| | M | 0 | 100 | 4.6 | 66.3 | -2.3 | 83 | 13.9 | -1.2 |
| No designation neighbourhood | U | -28.8 | | -28.8 | | -28.8 | | -28.8 | |
| | M | -13.5 | 53.2 | -1.7 | 94.1 | -10.3 | 64.3 | -8.5 | 70.5 |
| % Neighbourhood born in Canada | U | -8.8 | | -8.8 | | -8.8 | | | |
| | M | -15.2 | -73.2 | -14.1 | -60.3 | -9.7 | -10.3 | | |
| % Neighbourhood with PSE | U | -11.6 | | -11.6 | | -11.6 | | | |
| | M | -27.4 | -136 | 0.1 | 98.9 | -8.5 | 26.7 | | |
| % Unemployment in neighbourhood | U | 33 | | 33 | | 33 | | | |
| | M | 12.8 | 61.2 | 5.2 | 84.4 | 10.8 | 67.2 | | |
| % of families in neighbourhood that are lone-parent | U | 18.5 | | 18.5 | | 18.5 | | | |
| | M | 12.3 | 33.4 | -7.2 | 61.3 | 12.5 | 32.3 | | |
| % of families in neighbourhood that are lone-parent (female) | U | 20.5 | | 20.5 | | 20.5 | | | |
| | M | 12.6 | 38.5 | -5.9 | 71.4 | 12.8 | 37.4 | | |
| % of Families in neighbourhood with children | U | 8.6 | | 8.6 | | 8.6 | | | |
| | M | 16.9 | -95.8 | -4.9 | 43.4 | 15.2 | -75.5 | | |

Of particular note are the columns pertaining to bias. PSM reduced the overall mean bias from 21.4 to 8.6 with a 100% reduction achieved for eight covariates. However, the mean and median biases after matching (8.6 and 9.0 respectively) were still fairly high, thus indicating that we had not built a suitable control group (see Table 12). Furthermore, several covariates, even after matching, had bias percentages well above the generally accepted value of 5% (Grilli & Rampichini, 2011). On the basis of this evaluation we reran ptest on a model that excluded high school average as a covariate. Table 12 shows that this model further reduced the mean bias to 7.9%. Despite this success we found that the matching could be further improved. We were aware of asymmetries in the data between HYPE and non-HYPE students in terms of previous education (namely that HYPE students generally lacked high school grades) and ran an additional model omitting this variable. Table 12 shows that the mean bias was only reduced by 0.7% from the previous model. Finally, inspection of the covariate means suggested that those variables that are measured at the neighbourhood level maintained significant bias in our sample. We ran a final model excluding all level 2 variables except the overarching Toronto neighbourhood designation variables. Model 4 presents our best model in which the overall mean bias was reduced to 3.9% with a median bias of 2.1%. A bar chart visualization (Figure 3) of the covariate means before and after matching shows the effectiveness of the matching procedure while Figure 4 demonstrates the region of common support after matching.

Table 12: Mean and Median Bias in Each Model

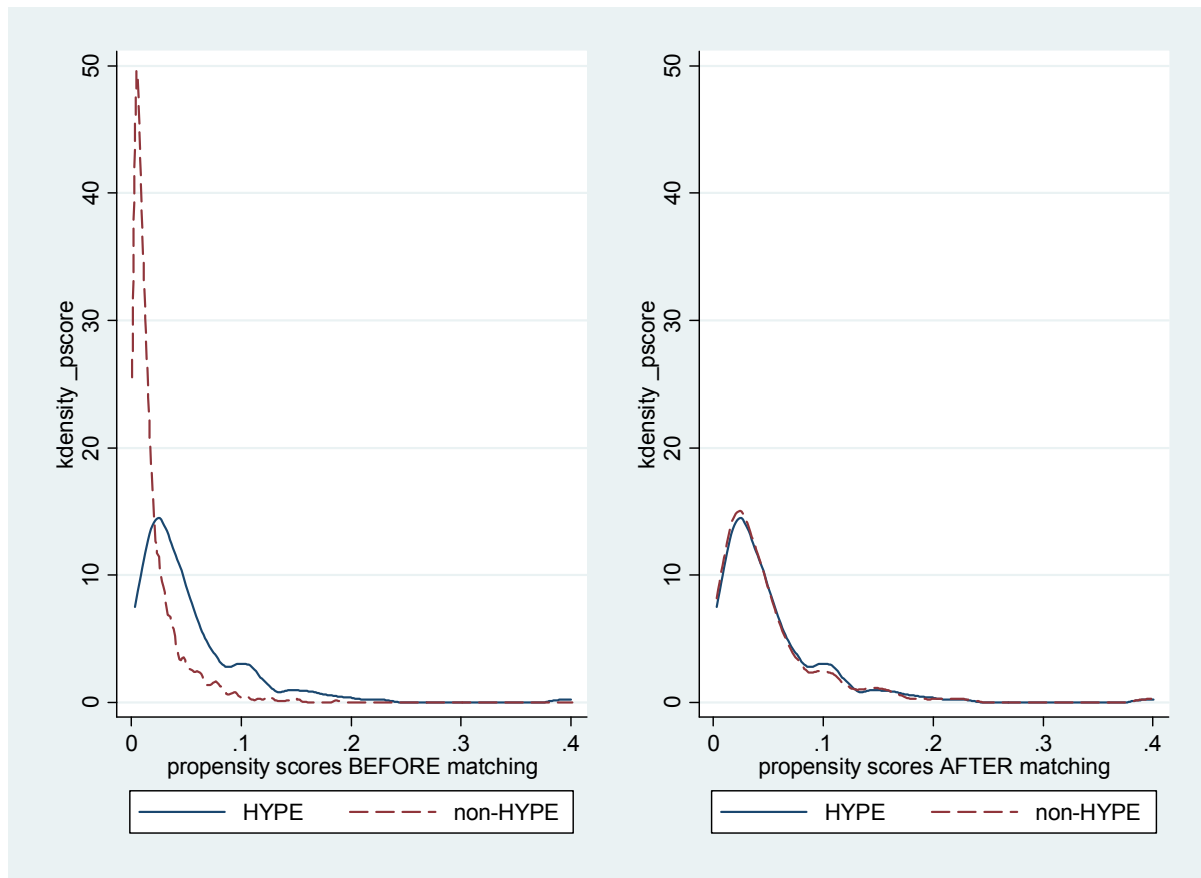
| Model | Sample | Ps R2 | LR chi2 | p>chi2 | Mean Bias | Med Bias | B | R | % Var |
|-------|-----------|-------|---------|--------|-----------|----------|--------|------|-------|
| 1 | Unmatched | 0.144 | 76.23 | 0 | 21.4 | 16.7 | 135.1* | 0.81 | 14 |
| | Matched | 0.137 | 16.36 | 0.839 | 8.6 | 9 | 89.7* | 1.25 | 0 |
| 2 | Unmatched | 0.198 | 230.61 | 0 | 20.8 | 16.7 | 147.3* | 1.28 | 17 |
| | Matched | 0.066 | 21.69 | 0.598 | 7.9 | 6.5 | 61.3* | 1.23 | 0 |
| 3 | Unmatched | 0.123 | 142.52 | 0 | 18.1 | 16.7 | 114.8* | 0.84 | 17 |
| | Matched | 0.046 | 14.96 | 0.896 | 7.2 | 7.8 | 50.7* | 0.88 | 0 |
| 4 | Unmatched | 0.11 | 128.28 | 0 | 18.5 | 16.7 | 108.9* | 0.87 | . |
| | Matched | 0.01 | 3.17 | 1 | 3.9 | 2.1 | 23.1 | 1.17 | . |

Figure 3: Bar Chart Visualization of Covariate Means Before and After Matching for Model 4



Looking at the propensity score distributions (Figure 4) we see that the propensity scores for HYPE participants (the treatment group) and the non-HYPE participants (control group) for model 4 are mostly overlapping. The plot for this model shows that the matching procedure successfully created a control group of non-HYPE students, omitting a large number of students who had a very low propensity for the HYPE program.

Figure 4: Propensity Score Distribution Before and After Matching for Model 4



Average Effect of Treatment on Treated (ATT)

This section presents the average treatment effect on the treated (ATT), which measures the effect of HYPE program participation on students' college outcomes of interest. Table 13 summarizes the effect and significance of the HYPE program versus the control group on our three outcomes of interest across four models. Our discussion and analysis will focus solely on Model 4 given its particularly good fit, as previously discussed.

Table 13: The Average Effect of the Treatment (ATT) on College Outcomes

| Outcome | Model | # treated | # control | ATT | Std. Error | t |
|----------------------|-------|-----------|-----------|--------|------------|--------|
| Complete/in progress | 1 | 46 | 46 | 0.022 | 0.091 | 0.24 |
| | 2 | 119 | 141 | -0.015 | 0.068 | -0.213 |
| | 3 | 119 | 165 | -0.129 | 0.063 | -2.069 |
| | 4 | 119 | 568 | -0.095 | 0.048 | -1.988 |
| Persistence | 1 | 46 | 46 | 0.022 | 0.116 | 0.188 |
| | 2 | 119 | 131 | -0.034 | 0.077 | -0.437 |
| | 3 | 119 | 165 | -0.088 | 0.075 | -1.18 |
| | 4 | 119 | 568 | -0.121 | 0.055 | -2.213 |
| Academic Performance | 1 | 46 | 46 | 0.043 | 0.108 | 0.404 |
| | 2 | 112 | 162 | -0.217 | 0.069 | -3.16 |
| | 3 | 112 | 202 | -0.221 | 0.064 | -3.479 |
| | 4 | 112 | 1151 | -0.188 | 0.051 | -3.661 |

On each outcome of interest the effect of the HYPE program is statistically significant as the t-value exceeds the critical value of +/- 1.96. The effect ranges from 9.5% for complete/in progress to 18.8% for academic performance. Interestingly, the direction of the effect is the opposite of what was anticipated. HYPE participants fared worse than their non-HYPE counterparts for each outcome. Inspection of the standard errors suggests a low level of variance in the treatment effect, therefore the estimate is not likely variable from one individual to another (Gadbury & Iyer, 2004). However, many important characteristics of HYPE participants were not captured in the data collection which could affect the differences in the college outcomes between the treated and the control groups. In other words, our findings may be sensitive to unmeasured factors.

Test of Unobserved Heterogeneity

We performed sensitivity tests for unobserved heterogeneity using the “mhbounds” program in STATA. This test employs Rosenbaum’s (2002) bounding approach to determine the impact of unobserved variables that could bias the selection process of the treatment group. Upper and lower bounds provide further information on the amount of change in the odds of participating in the treatment that would be required to render the treatment results insignificant (Becker & Caliendo, 2007). Tables 14, 15 and 16 report the sensitivity of our models for average treatment effects in terms of complete/in progress, persistence and academic performance. Given the omission of crucial sociodemographic measurements in our data set we will analyze these tables working under the assumption that we have underestimated the effect of the HYPE program (Q mh-, p mh-). That is, the individuals who are the most likely to enter the HYPE program are already at greater risk for withdrawal than those who do not enter it.

Under the assumption of no hidden bias ($\Gamma = 1$) we see that the effect of treatment on complete/in progress is not significant. We see further in Table 14 that if we assume that we have underestimated the effect of

the HYPE program, the effect becomes significant by including a variable that nearly doubles the odds of selection ($\Gamma = 1.9$).

Table 14: MHBounds Sensitivity Testing (Complete/In Progress)

| Gamma | Q_mh+ | Q_mh- | p_mh+ | p_mh- |
|-------|----------|----------|----------|----------|
| 1 | 0.30892 | 0.30892 | 0.378691 | 0.378691 |
| 1.05 | 0.479423 | 0.139872 | 0.315819 | 0.444381 |
| 1.1 | 0.64142 | -0.02195 | 0.260625 | 0.508754 |
| 1.15 | 0.796327 | -0.11124 | 0.212921 | 0.544285 |
| 1.2 | 0.944766 | 0.036519 | 0.172389 | 0.485434 |
| 1.25 | 1.08728 | 0.178248 | 0.138456 | 0.429264 |
| 1.3 | 1.22435 | 0.314441 | 0.110409 | 0.376593 |
| 1.35 | 1.3564 | 0.445535 | 0.087485 | 0.327967 |
| 1.4 | 1.48381 | 0.571914 | 0.06893 | 0.28369 |
| 1.45 | 1.6069 | 0.693923 | 0.054039 | 0.243865 |
| 1.5 | 1.72597 | 0.811869 | 0.042176 | 0.208433 |
| 1.55 | 1.8413 | 0.926028 | 0.032788 | 0.177216 |
| 1.6 | 1.95314 | 1.03665 | 0.025402 | 0.149949 |
| 1.65 | 2.06169 | 1.14396 | 0.019619 | 0.12632 |
| 1.7 | 2.16716 | 1.24816 | 0.015112 | 0.105986 |
| 1.75 | 2.26972 | 1.34945 | 0.011612 | 0.088597 |
| 1.8 | 2.36956 | 1.44798 | 0.008905 | 0.073812 |
| 1.85 | 2.46682 | 1.54391 | 0.006816 | 0.061305 |
| 1.9 | 2.56163 | 1.6374 | 0.005209 | 0.050774 |
| 1.95 | 2.65413 | 1.72856 | 0.003976 | 0.041944 |
| 2 | 2.74444 | 1.81752 | 0.003031 | 0.034568 |

In terms of our model on persistence we find the initial model, under the assumption of no hidden bias, to be significant and positive. However, this finding is extremely sensitive to hidden bias. At $\Gamma=1.05$, if we have underestimated the effect of the HYPE program, the results are no longer significant.

Table 15: MHBounds Sensitivity Testing (Persistence)

| Gamma | Q_mh+ | Q_mh- | p_mh+ | p_mh- |
|--------------|--------------|--------------|--------------|--------------|
| 1 | 1.71919 | 1.71919 | 0.04279 | 0.04279 |
| 1.05 | 1.90224 | 1.54415 | 0.02857 | 0.061276 |
| 1.1 | 2.07337 | 1.3738 | 0.019069 | 0.084751 |
| 1.15 | 2.23718 | 1.21122 | 0.012637 | 0.112905 |
| 1.2 | 2.39429 | 1.05571 | 0.008326 | 0.14555 |
| 1.25 | 2.54526 | 0.906676 | 0.00546 | 0.182289 |
| 1.3 | 2.69058 | 0.763585 | 0.003566 | 0.222557 |
| 1.35 | 2.83068 | 0.625971 | 0.002322 | 0.265667 |
| 1.4 | 2.96593 | 0.493421 | 0.001509 | 0.310858 |
| 1.45 | 3.09669 | 0.365566 | 0.000978 | 0.357344 |
| 1.5 | 3.22326 | 0.242077 | 0.000634 | 0.40436 |
| 1.55 | 3.34591 | 0.122655 | 0.00041 | 0.45119 |
| 1.6 | 3.46489 | 0.007034 | 0.000265 | 0.497194 |
| 1.65 | 3.58044 | -0.10503 | 0.000172 | 0.541823 |
| 1.7 | 3.69275 | -0.06149 | 0.000111 | 0.524513 |
| 1.75 | 3.80202 | 0.043759 | 0.000072 | 0.482548 |
| 1.8 | 3.90841 | 0.14604 | 0.000046 | 0.441945 |
| 1.85 | 4.01208 | 0.245527 | 0.00003 | 0.403024 |
| 1.9 | 4.11318 | 0.342372 | 0.00002 | 0.366035 |
| 1.95 | 4.21184 | 0.436719 | 0.000013 | 0.331158 |
| 2 | 4.30819 | 0.528697 | 8.20E-06 | 0.298508 |

Finally, in our model estimating the effect of HYPE participation on academic performance, the Mantel-Haenszel test shows that the treatment at $\Gamma = 1$ is insignificant and that even a bias in selection that would double the odds of participation in the HYPE program would not make it significant.

Table 16: MHBounds Sensitivity Testing (Academic Performance)

| Gamma | Q_mh+ | Q_mh- | p_mh+ | p_mh- |
|--------------|--------------|--------------|--------------|--------------|
| 1 | 1.58757 | 1.58757 | 0.056191 | 0.056191 |
| 1.05 | 1.76236 | 1.42075 | 0.039004 | 0.077695 |
| 1.1 | 1.92563 | 1.25824 | 0.027075 | 0.104152 |
| 1.15 | 2.08191 | 1.10314 | 0.018675 | 0.134982 |
| 1.2 | 2.23181 | 0.954795 | 0.012814 | 0.169841 |
| 1.25 | 2.37585 | 0.81262 | 0.008754 | 0.208218 |
| 1.3 | 2.51451 | 0.676115 | 0.00596 | 0.249484 |
| 1.35 | 2.64818 | 0.544834 | 0.004046 | 0.292934 |
| 1.4 | 2.77725 | 0.418381 | 0.002741 | 0.337834 |
| 1.45 | 2.90202 | 0.296405 | 0.001854 | 0.38346 |
| 1.5 | 3.0228 | 0.178591 | 0.001252 | 0.42913 |
| 1.55 | 3.13985 | 0.064654 | 0.000845 | 0.474225 |
| 1.6 | 3.25341 | -0.04566 | 0.00057 | 0.518209 |
| 1.65 | 3.36368 | -0.13576 | 0.000385 | 0.553995 |
| 1.7 | 3.47088 | -0.03241 | 0.000259 | 0.512928 |
| 1.75 | 3.57517 | 0.06794 | 0.000175 | 0.472917 |
| 1.8 | 3.67672 | 0.165468 | 0.000118 | 0.434288 |
| 1.85 | 3.77568 | 0.260334 | 0.00008 | 0.397303 |
| 1.9 | 3.87219 | 0.352684 | 0.000054 | 0.362163 |
| 1.95 | 3.96637 | 0.442653 | 0.000036 | 0.329008 |
| 2 | 4.05835 | 0.530367 | 0.000025 | 0.297929 |

While our analysis has provided some interesting results pertaining to the effect of the HYPE program on its participants, post-hoc tests tell us that we must interpret these findings with caution. We assumed, in our data, that the only difference between the control group and the test group was HYPE participation (the treatment). However, it appears as though our sample is highly sensitive to a bias that changes the odds of participation in the HYPE program. After reviewing qualitative interviews with HYPE facilitators it is not difficult to envision crucial unobserved characteristics of HYPE participants.

Discussion

Participants in the HYPE program are different from other students at the college in that they face a variety of additional challenges and potential life difficulties. In fact, it is these challenges that form the basis of admission criteria for the program itself (Maher & Bertin, 2013). Important aspects of these differences were not captured in the administrative or the neighbourhood data. This is an important consideration for our research as “to the degree that participation variables are incomplete, the PSM results can be suspect” (Khandker, Koolwal, & Samad, 2009, p. 63). For instance, while females are more likely to participate in HYPE, female HYPE participants often faced additional challenges (e.g., teen pregnancy, being a single

mother), or are interested in being a woman in a trade (Maher & Bertin, 2013). There were some women who began using HYPE simply for the daycare option but many women were using HYPE to move on with their lives. An example was C, a single mother in her late 20s with five children who has gone on to studying full time after HYPE: *“It is changing her and her kids’ lives.”*

HYPE participants also include youth with interrupted, failed or fractured educational attainment; youth from low-income families; youth in conflict with the law; Indigenous youth; immigrant and refugee youth; LGBTQ youth; young lone-parents and youth with mental health and/or disability issues; Crown wards and former Crown wards; youth who are the first in their family to explore the possibility of postsecondary education; and newcomer youth with challenging transitional and adjustment issues. The impression of the peer mentors was that many of the HYPE participants’ families put an emphasis on making money and fulfilling very short-term goals. They felt that participants lacked role models who valued education.

As our sensitivity tests demonstrate, the inclusion of a single variable that could change the odds of HYPE membership by as little as 5% would have an impact on academic performance. The impact of a bias that would change the odds of selection for HYPE by 50% would impact completion/in progress. It is not difficult to envision that life challenges such as pregnancy or having a criminal record would easily satisfy these odds.

Notwithstanding the aforementioned details of the HYPE population, the results of our analysis may lack face validity in terms of program evaluation insofar as our conceptualization of success is at odds with the goals that would constitute success for the HYPE program. That is, our outcomes of interest are not the primary outcomes that the HYPE program seeks to accomplish and we are thus not evaluating the HYPE program on its own terms. Notably, Maher and Bertin (2013) state that program achievements for HYPE include instilling and developing time-management skills, interpersonal skills and problem-solving skills in participants. HYPE seeks to engage underserved youth and provide them with confidence and a sense of self-motivation that they were previously lacking (Radner, 2010, 2010b).

Teachers spoke at some length about the tensions between meeting participant expectations and offering program participants a realistic assessment of the work required to be successful academically. This is evident in comments by HYPE faculty who note the differences in the academic characteristics of the HYPE program. For example, they argue that HYPE program courses do not receive the same curriculum oversight as “regular” courses and therefore program success is not always equivalent to academic success. Faculty noted that one challenge facing the HYPE program is “getting the curriculum right” and ensuring that it was not too “watered down” as to prove insufficient as preparation for full-time studies. A faculty member commented: “I want to set these young people up not for failure but to really give them a taste of what college life is about.”

Significant differences in the experience of a six-week HYPE course and a regular full-time course means that building motivation in students to continue with their studies constitutes success in the HYPE program, but should not be seen as being equivalent with having built academic ability. One faculty member notes the contrast when referencing academic standards: “Don’t just let them graduate. Hold them to academic expectations — push responsibility and accountability.”

Challenges exist for HYPE participants even after having successfully completed the program and enrolling in postsecondary studies. The most obvious challenge is the cessation of the provision of material benefits such as breakfast and lunch, fares for public transportation and learning materials (Radner, 2010b); for example, lone-parents could not always afford daycare and tuition. These benefits do not continue with students into their full-time studies and they must thus focus on more than just their attendance. Given that these features were intended to mitigate some of the sources of students' motivational deficiencies, their termination would reintroduce these challenges in a more strenuous, stressful environment.

The effect of motivational differences between HYPE participants and other students is also increased by the details of the program's timing. Due to its design, the HYPE program ends at a point in the academic year where fall programs are often full by the time that HYPE graduates would be eligible for application or enrolment. Therefore, many HYPE graduates are not able to select their first program of choice, subsequently lacking engagement in their program and leading to their dropping out. Facilitators also remarked that many HYPE participants faced challenges around what program to enrol in that may not have been experienced by non-HYPE students. Therefore the effect of the initial differences in motivation between HYPE and non-HYPE students is exacerbated.

Finally, the HYPE program is characterized by its commitment to individual learning plans. These are opposed to the model route through PSE to which our dependent variables, and their measurement, correspond. Program staff noted that a lot of the learning took place in individual sessions rather than the classroom; that one-on-one time was important when trying to reach the students in a meaningful way. This is especially relevant for our measures of success (complete/in progress) and persistence as HYPE graduates may make choices to prolong their educations in accordance with their specific life contexts, thus dropping them out of a model route. Those who may appear to have dropped out of their PSE may not in fact be "true dropouts" (Maher & Bertin, 2013).

Conclusion

As stated by Radner (2010b): "Succeeding in the program is a departure from the norm for them [HYPE participants]" (p. 7). Given the multiple challenges and barriers experienced by the youth who are served by the HYPE program, the fact that HYPE students complete the program, with roughly half of them enrolling in a college, and putting themselves in a position to achieve academic performance on par with other students at Centennial, is an achievement in itself. As far as achievement in the terms of the model route, we must conclude that more comprehensive data that focuses on the minutia of HYPE participants' lives is needed to give justice to the question of the impact that HYPE has on its participants. Collecting additional data and tracking student progress is key for program and service assessment and improvement, including more universal data collection through a universal identifier such as the Ontario Education Number (OEN). Future research should also include an increased proportion of qualitative measures because — regardless of our best efforts in matching the HYPE group to a comparable control group — the diversity of the student population and data limitations render quantitative methods alone insufficient for measuring the impact of a program such as HYPE.

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