

## **Supporting Community College Student Success: Evidence from a Randomized Controlled Trial**

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## **Abstract**

This paper presents findings from a randomized controlled trial studying a comprehensive program designed to support students in achieving their goals. One Million Degrees (OMD) is a non-profit organization serving community college students in the Chicago metro area that supports students financially, academically, personally, and professionally. Results from our study demonstrate that the randomized offer of a spot in the OMD program leads to a statistically significant and substantively meaningful increase in community college enrollment, persistence, and associate's degree attainment three years after randomization and substantively meaningful and marginally significant impacts on degree attainment OR transfer. Applicants who applied while still in high school were less likely to take up the offer of the program than students who were already enrolled in community college, but those high school students who enrolled outperformed their control group peers by a substantially larger margin. Finally, we find the program does not appear to affect the likelihood that students will enroll in a four-year college.

## **Introduction**

Community colleges have the potential to be powerful vehicles for social mobility in the United States. As institutions with tuition rates that are a fraction of the cost of four-year public and private colleges, they are a critical resource for students looking for a relatively less expensive and more flexible option to attain a degree. Their affordability makes them a particularly attractive option for students from low-income backgrounds and first-generation college students. Community colleges enroll nearly half of all postsecondary students in the U.S., and graduates who earn an associate's degree increase their earnings by more than 30 percent over a lifetime (Carnevale et al., 2014; The White House, 2015). However, for too many students, community colleges are falling short of their potential. Nationally, two-thirds of first-time, full-time, degree-seeking students who enroll in community college do not earn a degree within three years (National Center for Education Statistics, 2017). In Chicago, the site of our study, the three-year community college graduation rate is just 22.9 percent (City Colleges of Chicago, 2018).

In this paper, we present findings from a randomized controlled trial (RCT) studying the effectiveness of a comprehensive support program designed to help students achieve their goals by addressing common barriers to community college completion. One Million Degrees (OMD) is a non-profit organization operating at all seven campuses of the City Colleges of Chicago (CCC, Chicago's community college district) and at three community colleges in the Chicago suburbs: Prairie State, South Suburban, and William Rainey Harper (Harper). The colleges participating in the study are the seven City Colleges and Harper. OMD uses a comprehensive approach to serve community college students. Its program supports students financially, academically, personally, and professionally through financial incentives, skill-building workshops, advising, and coaching. OMD students meet at least monthly with program coordinators, staff who work with scholars to set and reflect on academic and professional goals and encourage their academic and personal progress. Program coordinators work with an assigned caseload of 60-65 students and are embedded on the college campus, allowing students to meet with them

on campus and enhancing Program coordinators' ability to connect students to additional resources and services through the college. Depending on a scholar's academic interests, risk for stop out, and stage in their community college journey, scholars may meet with their program coordinator as often as weekly. Students also attend monthly workshops that include meeting with a volunteer coach and participating in activities designed to build professional skills. By participating regularly in professional development programming and similar OMD events, scholars receive a performance-based stipend in addition to their last-dollar scholarships.

In this paper, we find that the offer of a spot in the OMD program leads to a 4 percentage point increase in initial enrollment in college the fall after students apply to the program. Over the course of the next six academic terms, students offered a spot in the program continue to be more likely to be enrolled in college or to have earned a degree (the magnitude of these differences range between 1 and 5 percentage points). Three years after randomization, individuals offered a spot in the program have earned an associate's degree at rates that are 2 percentage points higher than their control group peers. We find no evidence of a difference between those who were offered a spot in the program and the control group in their likelihood of enrolling in a four-year college over this same period, suggesting that the program is not diverting students who would otherwise seek out a four-year degree, but also that it is not facilitating transfer to four-year institutions. For individuals who took up the offer of the program (35 percent), effects were substantially larger: an 12 percentage point increase in initial enrollment and a 8 percentage point increase in degree attainment.

These findings add promising evidence to the growing body of literature indicating that comprehensive support programs can substantially improve community college students' outcomes. By demonstrating that such programming is effective in a different context, with a different management structure (i.e., programming implemented by a non-profit provider rather than the community college itself), and with a theory of change focused on the accumulation of social capital and fostering

community, these results provide optimism for the generalizability of existing positive findings about comprehensive support programs for community college students.

Interestingly, the treatment on the treated effects in our study were driven by students who applied to the program when still in high school. High school applicants were less likely to take up the offer of the program than students who were already enrolled in community college but outperformed their control group peers by a larger margin. While additional work is needed to understand these differential effects, these subgroup differences provide suggestive evidence for how limited resources could be targeted to lead to the largest impacts for students.

The paper proceeds as follows. We first provide a more detailed description of the OMD program model and how it is designed to address common barriers to community college success. We then situate this study in the broader literature on the effectiveness of comprehensive support services for improving community college completion rates. Next we provide an overview of the study's methodology, data, and analytic approach. Finally, we present study findings, discuss our takeaways from these findings.

### **Barriers to Community College Success and the One Million Degrees (OMD) Program**

Community college students from low-income backgrounds face multiple, interrelated systemic barriers that make completing an associate's degree challenging. While community college tuition is more affordable than tuition at four-year institutions, *financial barriers* remain a major challenge for students. Many low-income community college students live on the brink of economic hardship (Barr & Blank 2009; Shieler 2008; Bertrand et al., 2004). Just one unexpected expense can have long-term effects on students' likelihood of completing a degree, with financial instability cited as the most common reason students disengage from school (Johnson et al., 2015). Even students who enter college with the support of federal or local aid confront a wide array of financial challenges, including paying for tuition, books, or living expenses (Goldrick-Rab, 2016). Facing mounting debt, students may feel pressure to work more, taking time and focus away from their primary goal of pursuing their degree (Welbeck et al., 2014).

Like many college students in other contexts, community college students often face *personal barriers* to graduation as well. Students from low-income backgrounds, especially first-generation college students, often have fewer direct role models who have successfully navigated the transition to and through college when compared to their wealthier counterparts. On many college campuses, these students also see few peers who come from similar backgrounds (Murphy et al., 2007). As a result, though they aspire to college, many of these students harbor doubts about their ability to succeed (Walton & Brady, 2017). While it is common for first-year students to experience apprehension about finding a new community and adjusting to increased autonomy, students from low-income backgrounds often struggle to navigate the culture shock in their new college environments (Pittman et al., 2017). They are also likely to internalize the common challenges that come with this transition, wondering if they truly belong (Yeager et al., 2016).

From an early age, students from low-income backgrounds face systemic barriers that often limit their opportunity to prepare for academic success in college. Key differences in school quality and educational experiences affect their likelihood of earning a college degree in myriad ways. For example, as a result of racial and economic segregation, students from wealthier backgrounds often attend well-resourced schools with higher expenditures per pupil, smaller student-counselor ratios, and a rich array of courses designed to prepare students for the academic demands of college, giving them a strong advantage (Charles, 2003; Kozol, 1991; Lareau & Goyette, 2014; Ostrander, 2015; Vigdor & Ludwig, 2007). On the other hand, without access to the same resources to help build an academic foundation for college success, many low-income students face *academic barriers* to college success (Duncan & Murnane, 2011). For example, as a prerequisite for enrollment in introductory-level college courses, many freshmen from low-income backgrounds often spend at least a part of their first year taking remedial courses that offer partial or no credit, keeping them further behind their peers (Stewart, Lim, & Kim, 2015). These courses typically still carry the same financial obligation as a full-credit college

course, so students who take more remedial courses often end up paying more for college (Barry & Dannenberg, 2016).

The resource inequities in the education system are magnified in community colleges, which are underfunded relative to four-year institutions. The Delta Cost Project (2016) estimates that community colleges spend 75 cents on education expenses per student for every dollar spent at public four-year institutions. This gap in spending means that there are fewer resources for student supports, such as academic advising and supplemental instruction, that are critical for supporting the success of all students, but especially those from low-income backgrounds (Goolsbee, Hubbard, & Ganz, 2019).

Finally, the link between coursework and a student's post-college employment prospects are not always clear to students from low-income backgrounds, leading to *professional barriers* to success (McCoy & Bowen, 2015). Without connections to individuals working in the fields in which they are interested, many community college students have difficulty translating a degree into labor market success. Further, students who have not had access to the social capital and social networks needed to successfully transition into a career post-college may have more difficulty acquiring gainful employment after their time in school (Moschetti & Hudley, 2014).

OMD is the only Chicago-area non-profit that uses a comprehensive approach to support the success of the region's community college students. To be eligible to enroll in the program, students must be enrolled or plan to enroll full time in one of the community colleges where the program operates. To join the program, students must be eligible for the federal Pell Grant or for the Chicago STAR scholarship (a local promise of free CCC tuition for high-performing Chicago Public Schools graduates), have a grade point average (GPA) of at least 2.0, be pursuing their first college degree, and have at least one full year remaining to graduation. Students join the program either directly from high school, after they are already enrolled in community college, or occasionally as adults returning to school.

The program provides comprehensive supports designed to address the financial, personal, academic, and professional barriers that can interfere with scholars' plans to graduate. To address the *financial barriers* facing students from low-income backgrounds, scholars receive \$1,000 (CCC) or \$750 (Harper) annually in performance-based stipends to address any financial needs that might arise. In addition to providing additional financial security, the stipend acts as a critical recruitment and retention tool, with receipt of the stipend tied to meeting program participation requirements. The program offers last-dollar scholarships when needed to close any gap between financial aid and tuition but, given the program requirement that students be eligible either for a Pell grant or STAR scholarship, these funds are rarely needed. Scholars are also able to apply for up to \$250 in enrichment grants to offset expenses that will help them accelerate academically or professionally (e.g., membership dues to Phi Theta Kappa, conference registrations, four-year university application fees, etc.). In addition, the monthly workshops that scholars attend include financial literacy training to help scholars manage their household budgets and plan for economic mobility.

To address *personal barriers*, scholars are required to meet regularly with a program coordinator to discuss their academic plans and progress as well as address any issues that have arisen in a scholar's personal life that may impact their ability to engage in school. The program coordinators have caseloads (60-65:1) that are much lower than typical advisor-to-student ratios at CCC and Harper, allowing them to develop strong personal relationships and provide targeted individualized supports to students. As program coordinators are embedded on campus, they can also connect students to campus resources and support services that new students may be unable to access as easily.

To address *academic barriers*, scholars can access tutors and/or be referred to existing supports within the college. Scholars earning less than a C grade in any course or who are enrolled in a developmental education course are required to attend tutoring. Program coordinators support students in completing critical academic tasks, such as meeting class registration deadlines, submitting financial aid documentation, and developing academic plans. They also coach scholars as they progress through their

coursework, assisting them in applying to specialized programs within their college or supporting their transfer to a four-year university.

To address the *professional barriers* that scholars face, the program pairs each scholar with a coach, a local professional who volunteers to mentor scholars. While not always possible, OMD aims to match scholars with coaches who are working in their field of interest. The coaches and scholars jointly attend regular professional development events and workshops sponsored by the program. Further, coaches regularly meet and communicate with scholars outside of formal OMD programming to provide personalized supports, job shadowing, and networking opportunities to help them fulfill their career development goals as well as personal ambitions.

### **Contribution to the Literature**

The growing body of literature rigorously investigating interventions designed to improve outcomes for community college students has found somewhat mixed results. Neither interventions specifically targeting community college students with limited academic preparedness (Long, 2014; Matorell & McFarlain, 2011) nor interventions designed to reduce advisor-to-student ratios and improve the quality of academic counseling that students receive (Scrivener & Weiss, 2009) have been found to have long-term effects on degree attainment. Likewise, a randomized controlled trial examining the receipt of emergency financial assistance alone found that this type of support did not result in increased degree attainment (Evans, Kearney, Perry, & Sullivan, 2017).

The results from the studies of more comprehensive programs, designed to address the multiple barriers community college students face to degree attainment, have been more promising. For example, a randomized controlled trial of the *Stay the Course* program, which combined comprehensive case management (including academic and personal counseling) with emergency financial assistance, was found (though imprecisely) to increase students' six-term persistence and degree attainment in community college, especially for female students (Evans, Kearney, Perry, & Sullivan, 2017).

Likewise, and most closely aligned to the OMD program, a randomized controlled trial of the CUNY ASAP program has found the most promising results to date. The ASAP program includes many elements that closely parallel the key components of OMD, including comprehensive personal advising, enhanced tutoring and career advising services, tuition waivers and MetroCards (an important financial support in New York City), and seminars on goal-setting and study skills. The study found that ASAP has almost doubled students' graduation rates, reduced the rate that students' stop out of college, and increased credit attainment for participating students (Weiss, Ratledge, Sommo, & Gupta, 2019). These results were replicated in three community colleges in Ohio, where an RCT again found the program led to a doubling of the graduation rate (Sommo, Cullinan, Manno, Blake, & Alonzo, 2018).

The current study builds on this literature, providing additional evidence of the potential for comprehensive support programs to have substantial and sustained effects on community college students' chances of attaining a degree. While the OMD program includes many of the same features as the ASAP program, one difference is worth noting: OMD is operated by an independent non-profit organization, rather than the community college system itself. As such, the program provides an alternative means for scaling comprehensive supports to reach more students around the country.

## **Methodology**

To assess the effectiveness of the OMD model, we conducted a block randomized controlled trial at all seven campuses of CCC and one suburban Chicago-area community college, Harper College. As the largest community college system in Illinois and the fourth largest in the nation, and a large suburban community college system, respectively, CCC and Harper are ideal settings for this study. CCC has 4,000 faculty and staff serving 80,000 students annually at seven colleges and five satellite sites across the city of Chicago. CCC has an open enrollment policy that provides accessible, affordable postsecondary education for students from diverse ethnic, racial, and socioeconomic backgrounds. While the district has made remarkable progress in recent years, 77 percent of students who enroll in CCC do not attain an associate's degree within three years (City Colleges of Chicago, 2018). Harper College, located in

Chicago's northwest suburbs, serves more than 35,000 students annually. While Harper's graduation rate is slightly higher than CCC's (roughly 70 percent of students do not graduate within three years), the college's administration is committed to continuing to raise this rate and sees its partnership with OMD as a critical component of this effort.

OMD recruited students to participate in the program and the study through its normal application process, with students submitting an online application to express interest in the program. As is typically the case for OMD, potential scholars applied to the program the spring with the intention of formally enrolling in the program the following fall. For applicants who had not yet enrolled in college, this was frequently during the typical college application window during the senior year of high school, with students submitting applications to OMD concurrently with their other college and scholarship applications. The program regularly receives more applications than they have program slots and made especially robust recruitment efforts to ensure there were a sufficient number of applicants to the program to support the sample needed for the study. Once the program screened the application data to determine if candidates met the basic program eligibility criteria, the list of eligible candidates was sent to the research team, who randomly selected which applicants would be offered a spot in the program. Program offers were extended to selected students in late spring or early summer, with persistent efforts by program staff focused on enrolling as many of the eligible individuals as possible lasting through the summer.

Randomization was blocked on two characteristics: the campus the applicant was enrolled or intended to enroll in and whether the applicant was a graduating high school student or a current community college student. In spring 2016, a total of 1,452 unique, eligible OMD applicants were randomized, 779 of whom were offered a spot in the program. In spring 2017, 2,821 unique, eligible OMD applicants were randomized, 1,396 of whom were offered a spot in the program. In spring 2018, 623 unique, eligible OMD applicants were randomized, 398 of whom were offered a spot in the program.

Across these three cohorts, a total of 4,896 unique applicants were randomized, 2,573 of whom were offered a spot in the program.<sup>1</sup>

This paper presents initial enrollment outcomes for all three cohorts of students who were randomized into the study and three-year persistence and graduation outcomes for the first two study cohorts (which constitutes the vast majority of our sample). Table 1 below details the baseline characteristics of the students who were randomly assigned to the treatment and control groups. The vast majority of the study sample are students who are Black or Hispanic; roughly two-thirds identify as female. Nearly 60 percent of the sample are first-generation college students and, consistent with OMD program requirements, all are eligible for the Pell or STAR grants. The only statistically significant difference between the treatment and control groups at baseline was the portion of students who identified as belonging to an “other” race or ethnic group and the F-test assessing the joint probability that the baseline variables predict an offer of treatment was not significant.

**Table 1. Baseline Covariate Balance (Cohorts 1, 2, 3)**

<b>Baseline Characteristics</b>	<b>Treatment</b>	<b>Control</b>	<b>Difference</b>	<b>P-value</b>	<b>Standardized Difference</b>
<i>Race/ethnicity</i>					
Black	41.37%	37.43%	-3.94%	0.94	0.00
Hispanic	43.32%	46.99%	3.67%	0.10	0.04
White	6.12%	5.63%	-0.49%	0.93	-0.01
Asian	4.91%	5.02%	0.11%	0.48	-0.05
Multiracial	2.77%	2.90%	0.13%	0.55	-0.06
Native American	0.39%	0.30%	-0.09%	1.00	0.00
Other	1.09%	1.73%	0.64%	0.02*	-0.38
<i>Other Baseline Characteristics</i>					
Female	60.65%	60.71%	0.06%	0.92	0.00
Married	3.31%	3.20%	-0.11%	0.20	-0.14
Single	91.74%	92.77%	1.03%	0.47	0.05
Divorced	2.06%	1.43%	-0.64%	0.92	0.01
US Citizen	86.95%	86.59%	-0.36%	0.47	0.04

<sup>1</sup> Of the original 4,896 applicants who were randomized, one application was excluded because OMD had no record of this applicant, so we were not able to observe take-up. An additional 16 cases were excluded from this analysis; five of these students should have been excluded from randomization because they had a sibling from the program, and 12 students were missing a birthdate and therefore could not be linked to the NSC data. Consequently, the analytic sample contains 4,878 unique applicants.

Veteran	3.08%	2.60%	-0.48%	0.64	-0.05
First gen college	57.34%	60.32%	2.98%	0.61	-0.02
Pell-eligible	69.11%	67.11%	-1.99%	0.40	0.03
Chicago Star	35.26%	38.30%	3.04%	0.86	0.01
Age	21.53	20.51	-1.01	0.80	0.00
<i>N</i>	2,567	2,311			

NOTES: \*\* p<0.01, \* p<0.05, + p<0.1

The p-value column shows the p-value for t-tests for differences in mean baseline characteristics for students assigned to the treatment and control groups. These tests include school fixed effects to account for randomization within campus and age group blocks. F-test for joint probability that baseline variables predict an offer of treatment is  $F(16, 4,770) = 0.619$ ,  $p = 0.871$ .

Of the students who were offered a spot in the OMD program, 892 enrolled (a take-up rate of roughly 35 percent). Enrollment here is defined as formally joining the program and any engagement with program components. This could have occurred entirely over the summer prior to the program’s official start in the fall or during the academic year. Individuals who were invited to join the program did not take up this offer for a variety of reasons, including not enrolling in CCC or Harper, not enrolling full time, or not meeting other program requirements.

Table 2 compares the baseline characteristics of those who joined the program to those who did not. In general, individuals who accepted the offer of treatment generally looked like the broader sample with some notable exceptions. Individuals who enrolled in the program were more likely to be Black (45 percent compared to 39 percent of non-takers), less likely to be Hispanic (39 percent compared to 46 percent), more likely to be married (5 percent compared to 3 percent), less likely to be single (90 percent compared to 93 percent), more likely to be divorced (3 percent compared to 1 percent), less likely to be a first-generation college student (54 percent compared to 59 percent) and less likely to be a Chicago STAR scholarship recipient (33 percent compared to 36 percent). Program takers were also slightly older than non-takers, with an average age of 23 compared to 21 among non-takers. This is consistent with the fact that program take-up was higher among current community college students (46 percent) relative to recent high school graduates (20 percent), more of whom did not enroll in CCC or Harper in the fall following their application to the program.

**Table 2. Baseline Characteristics of Program Takers and Non-Takers (Cohorts 1, 2, 3)**

<b>Baseline Characteristics</b>	<b>Takers</b>	<b>Non-Takers</b>	<b>Difference</b>	<b>P-value</b>
<i>Race/ethnicity</i>				
Black	45.40%	39.22%	6.20%	0.00**
Hispanic	38.57%	45.85%	-7.30%	0.00***
White	5.04%	6.69%	-1.60%	0.10+
Asian	5.61%	4.54%	1.10%	0.23
Multiracial	3.36%	2.45%	0.90%	0.18
Native American	0.34%	0.42%	-0.10%	0.75
<i>Other</i>				
<i>Other Baseline Characteristics</i>				
Female	64.57%	58.57%	6.00%	0.00**
Married	4.60%	2.63%	2.00%	0.01**
Single	89.69%	92.84%	-3.10%	0.01**
Divorced	3.25%	1.43%	1.80%	0.00**
US Citizen	84.42%	88.30%	-3.90%	0.01**
Veteran	2.69%	3.28%	-0.60%	0.41
First gen college	54.04%	59.10%	-5.10%	0.01*
Pell-eligible	71.64%	67.76%	3.90%	0.04*
Chicago Star	33.30%	36.30%	-3.00%	0.13
Age	23.16	20.66	2.50	0.00***
<i>N</i>	892	1675		

NOTES: \*\* p<0.01, \* p<0.05, + p<0.1

The p-value column shows the p-value for t-tests for differences in mean baseline characteristics for students who took up and offer of a spot in the program and those who did not.

Outcome data for this study come from the National Student Clearinghouse (NSC). The NSC collects data from colleges and universities around the country on students' enrollment and degree attainment. As of the fall of 2011, NSC records were reported to include 93 percent of college enrollment nationally (Dynarski, Hemelt, & Hyman, 2015). The NSC give us the most comprehensive information on where study students enroll and ultimately receive degrees from any higher education institution, allowing us to track outcomes for both the treatment and control groups.

Initial enrollment data is drawn from the first term students had the opportunity to enroll in college after randomization. We consider a student to have enrolled in college if they enroll in any postsecondary institution in the fall following randomization. We further disaggregate these outcomes by examining whether they were enrolled in a two- or four-year institution and whether they were enrolled

part or full time. We analyze students' persistence in college by examining whether they were enrolled in college or had earned a degree in the six academic terms (three years) post randomization. We examine whether students ever had a four-year enrollment in the three years following randomization (either as a transfer student from community college or through direct enrollment). Finally, we examine whether students in our sample attained an associate's degree or transferred to a four-year institution over the same time period (the primary pre-registered outcome of interest in our study). Transfer here is defined as a four-year enrollment that follows community college enrollment. We examine degree attainment separately and whether the program increased the chances of achieving either outcome.

We estimate both the effect of an offer of a spot in the program (the intent to treat or the ITT effect) and the effect of actually enrolling in the program (the treatment on the treated or TOT effect). We modeled the ITT effect as follows:

$$Y_{ib} = P_{ib}\beta_1 + X_{ib}\beta_2 + \gamma_b + \varepsilon_{ib}$$

Where  $Y_{ib}$  is an outcome indicator for individual  $i$  in randomization block  $b$ ,  $P_{ib}$  is the treatment assignment indicator for individual  $i$  in randomization block  $b$ ,  $\beta_1$  is the coefficient for the treatment indicator,  $X_{ib}$  is a vector of the control covariates described in Table 1 for individual  $i$  in randomization block  $b$ ,  $\beta_2$  is a vector of coefficients for control covariates,  $\gamma_b$  is the individual intercept for each randomization block  $b$ , and  $\varepsilon_{ib}$  is the error term for individual  $i$  in randomization block  $b$ .

We estimate the TOT effects using assignment to treatment as an instrument for actual program participation (Bloom, 1984; Angrist, Imbens, & Rubin, 1996). To that end, we estimate the first stage as follows:

$$T_{ib} = P_{ib}\pi_1 + X_{ib}\pi_2 + \alpha_b + \mu_{ib}$$

Where  $T_{ib}$  is the take-up indicator for individual  $i$  in randomization block  $b$  (take-up is defined at any engagement with the OMD program),  $P_{ib}$  is the treatment assignment indicator for individual  $i$  in randomization block  $b$ ,  $\pi_1$  is the coefficient for the treatment indicator in the first stage,  $X_{ib}$  is the vector

of control covariates for individual  $i$  in randomization block  $b$ ,  $\pi_2$  is a vector of coefficients for control covariates in the first stage,  $\alpha_b$  is a vector of fixed effects for each of the randomization blocks, and  $\mu_{ib}$  is the error term for individual  $i$  in randomization block  $b$ .

The second stage is modeled as follows:

$$Y_{ib} = \hat{T}_{ib}\theta_1 + X_{ib}\theta_2 + \varphi_b + \omega_{ib}$$

Where  $Y_{ib}$  is an outcome indicator for individual  $i$  in randomization block  $b$ ,  $\hat{T}_{ib}$  is the predicted value of  $T$  from the first stage,  $\theta_1$  is the estimated effect of the intervention for students who took up the program,  $X_{ib}$  is the vector of control covariates for individual  $i$  in randomization block  $b$ ,  $\theta_2$  is a vector of coefficients for the control covariates,  $\varphi_b$  is the individual intercept for each randomization block  $b$ , and  $\omega_{ib}$  is the error term for individual  $i$  in randomization block  $b$ . All analyses and outcomes were pre-registered with the Open Science Framework prior to accessing outcome data from NSC. To benchmark the TOT estimates, we calculate the control complier mean (CCM), or the estimated average outcome for those in the control group who would have taken up the treatment had they been offered (Katz, Kling, & Liebman, 2001). The CCM is calculated by taking the regression adjusted average outcome for those who took up the program and subtracting the TOT.

## Results

The estimated first-year effects of the OMD program for the first three study cohorts can be found in Table 3 below. Applicants offered a spot in the OMD program and students who took up the program enrolled in college at a higher rate than those who did not. Enrollment in fall term following randomization (initial enrollment) was 4 percentage points higher for individuals offered a spot in the OMD program, an increase of 6 percent over the control group mean of 69 percent. This increase was driven by an increase in two-year college enrollment. Applicants offered a spot in the program were 5 percentage points more likely to enroll in a two-year institution than their control group peers. This increase in two-year enrollment did not appear to come at the expense of four-year enrollment. We see

treatment and control group applicants enrolling in four-year institutions at rates that are not statistically significantly different from one another.

The treatment on the treated effects on enrollment were substantially larger. Students who took up the offer of a spot in the program enrolled at rates that were 11 percentage points higher than those in the control group who would have chosen to join the program if it had been offered. This amounts to a 14 percent increase over the control complier mean of 80 percent.

An offer of the program also led to an increase in the likelihood that applicants enrolled in college full time, with those offered a spot in the treatment enrolling full time at rates that are 5 percentage points higher than those who were not offered a spot in the program. This amounts to an 11 percent increase over the control group mean of 42 percent. The treatment on the treated effect for full-time enrollment in fall term was 16 percentage points, a 29 percent increase over the control complier mean of 54 percent.

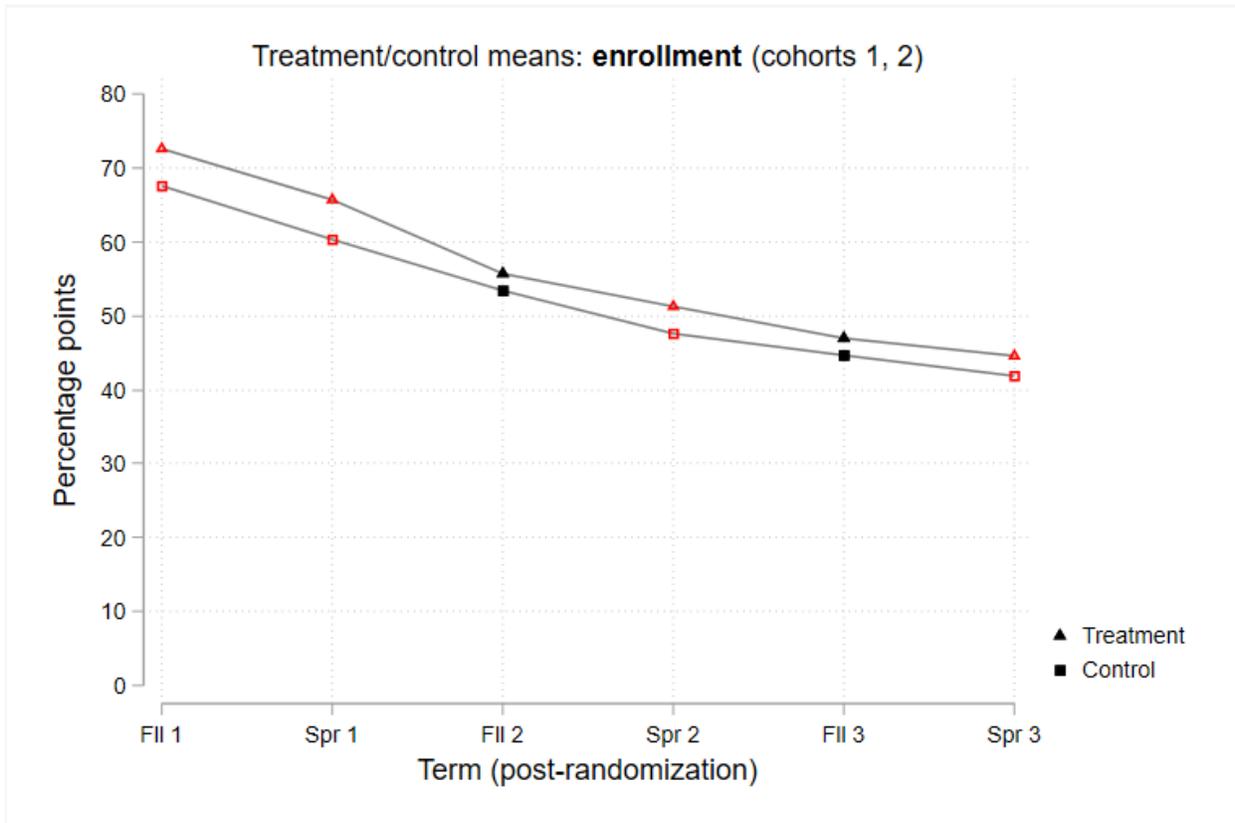
**Table 3. ITT and TOT Effects for Initial Enrollment**

<b>Outcome</b>	<b>N</b>	<b>Control Mean</b>	<b>Adjusted Treatment Mean</b>	<b>ITT</b>	<b>N Treated</b>	<b>Control Complier Mean</b>	<b>Adjusted Taker Mean</b>	<b>TOT</b>
Initial Enrollment								
Any postsecondary institution	4,878	0.69	0.73	0.04* (0.02)	892	0.80	0.91	0.11* (0.05)
Any 4-year institution	4,878	0.13	0.12	-0.01 (0.01)	892	0.04	0.01	-0.03 (0.04)
Any 2-year institution	4,878	0.56	0.61	0.05* (0.02)	892	0.76	0.91	0.15* (0.06)
Initial full-time enrollment	4878	0.42	0.47	0.05** (0.01)	892	0.54	0.70	0.16*** (0.05)

NOTES: Clustered robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1. All regressions include randomization block fixed effects. Control covariates include baseline characteristics listed in Table 1.

Figure 1 depicts the portion of cohort 1 and 2 applicants who were enrolled in college or had earned a degree over six terms post-randomization.<sup>2</sup> Over this time frame, students offered a spot in the program continue to be more likely to be enrolled in college or to have earned a degree (the magnitude of these differences range between 1 and 5 percentage points by term). This suggests that the program not only supports students in enrolling in college but persisting as well.

**Figure 1. ITT effects on enrollment or degree completion by term post-randomization**

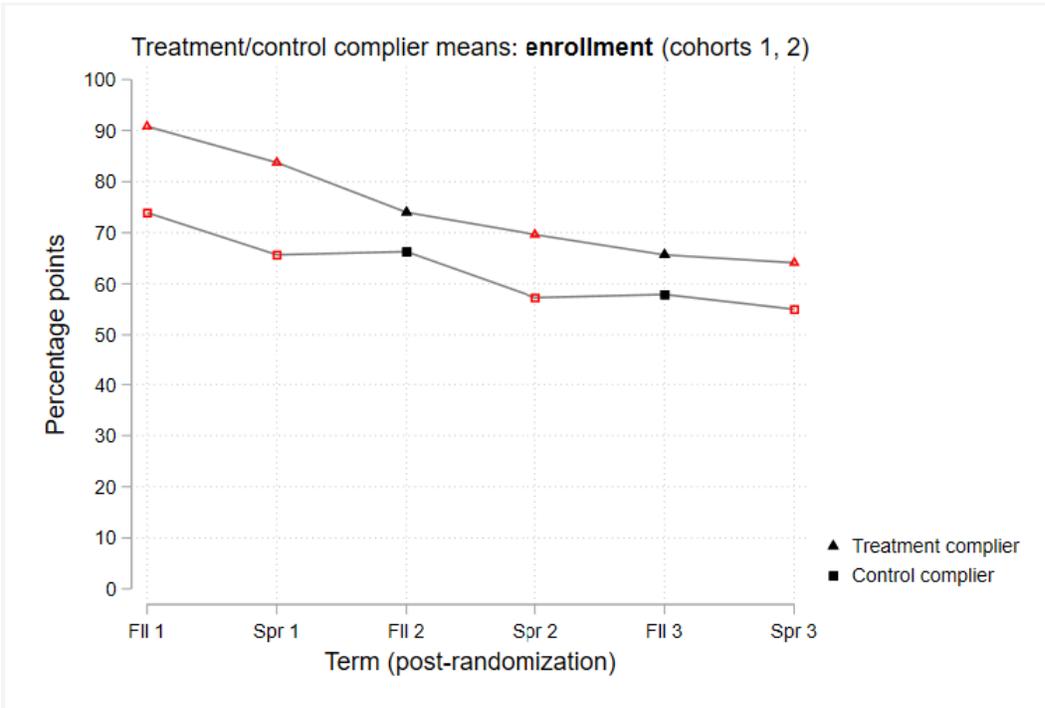


NOTES: Regression adjusted treatment and control means for the portion of each group who is still enrolled in any postsecondary institution or completed a degree by term post-randomization based on NSC records. Red/hollow marker denotes difference is statistically significant at the .05 level. All regressions include randomization block fixed effects. Control covariates include baseline characteristics listed in Table 1. N = 4,257 (Cohort 1 = 1,443; Cohort 2 = 2,814).

<sup>2</sup> Enough time has not yet elapsed to follow the third cohort of study students over the course of the entire three-year period post-randomization. However, given the third cohort was much smaller than the first two, we do not expect the key takeaways from the study to change when its data are available.

Figure 2 presents the same information, but now the comparison is between those who took up an offer of the program and the control complier mean. As in initial enrollment, the effects of the program are larger for those who took up an offer of the program (the magnitude of these differences by term range from 4 to 15 percentage points).

**Figure 2. TOT effects on enrollment or degree completion by term post-randomization**



NOTES: Regression adjusted taker and control complier means for the portion of each group that is still enrolled in any postsecondary institution or completed a degree by term post randomization based on NSC records. Red/hollow marker denotes difference is statistically significant at the .05 level. All regressions include randomization block fixed effects. Control covariates include baseline characteristics listed in Table 1. N = 4,257 (Cohort 1 = 1,443; Cohort 2 = 2,814). Of the students who applied to the program when in high school, 229 enrolled in the program. For those who applied while in community college, 663 enrolled.

Perhaps most importantly, the offer of a spot in the OMD program had a statistically significant impact on associate’s degree completion three years after randomization. Table 3 presents degree attainment effects for cohorts 1 and 2 three years post-randomization. An offer of a spot in the program was associated with a 2 percentage point increase in associate’s degree attainment, a 10 percent increase over the control group mean of 22 percent. For those who enrolled in the program, the effect grows to 8 percentage points or a 19 percent increase over the control complier mean of 39 percent.

When we look at the combined effect of either attaining an associate’s degree or transferring (defined as an enrollment in a 4-year institution following a community college enrollment), we see that the offer of a spot in the program is associated with a 2.2 percentage point increase, which is marginally significant at the 0.1 level. The treat-on-the treated analysis finds a 7.5 percentage point increase in either

attaining an associate's or transferring to a four-year institution. This effect is statistically significant at the 0.05 level.

We also examine program effects on any four-year college enrollment over the same period. For the purpose of this analysis, an individual is considered to have a four-year enrollment if they enroll in any four-year institution at any time over the course of the three years following randomization. This measure includes students who enrolled in a four-year institution in lieu of community college as well as students who enrolled in community college and then transferred to a four-year institution (with or without first attaining an associate's degree). We find no statistically significant differences in ever being enrolled four-year college in the three years following graduation between those offered a spot in the program and the control group. Likewise, the TOT estimates are not statistically significant.

**Table 4. ITT and TOT effects for associate’s degree attainment and four-year college enrollment three years after randomization**

<b>Outcome</b>	<b>N</b>	<b>Control Mean</b>	<b>Adjusted Treatment Mean</b>	<b>ITT</b>	<b>N Treated</b>	<b>Control Complier Mean</b>	<b>Adjusted Taker Mean</b>	<b>TOT</b>
Associate’s degree attainment	4,257	0.22	0.24	0.02** (0.01)	728	0.39	0.47	0.08** (0.03)
Four-year college enrollment	4,257	0.32	0.31	-0.01 (0.02)	728	0.35	0.33	-0.02 (0.05)
Associate’s degree attainment OR transfer	4,257	0.26	0.28	0.02+ (0.12)	728	0.46	0.54	0.08* (0.06)

NOTES: All outcomes are measured three years after randomization. Clustered robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1. All regressions include randomization block fixed effects. Control covariates include baseline characteristics listed in Table 1.

To begin to unpack what is driving the impact of the OMD program, we examined subgroup effects for two important groups of applicants: students who apply to the OMD program when they are still in high school and those who apply when they are already enrolled at an institution served by OMD. Table 5 details the intent to treat effects for these two subgroups. These effects of the program on initial enrollment, initial two-year enrollment, initial full-time enrollment, degree attainment and degree attainment OR transfer are only statistically significant for the high school student subgroup; none of the program effects on these outcomes is significant for the college student subgroup. The fact that the program appears to have only improved initial enrollment for high school students is perhaps not surprising, as returning community college students have already navigated the college enrollment process and are already enrolled in a 2-year college by definition. However, that the program has a statistically significant effect on degree attainment for high school students, but not college students, is still notable. This finding may be driven by the larger size of the high school student subgroup or the lower control group means for this group, providing more room for improvement by the program. As we might expect given that effects are significant only among the high school student subgroup, across all the outcomes examined, the effect sizes among high school students were larger than the effect sizes among community college students, and these differences in effect sizes were statistically significant for two of the outcomes (initial enrollment and initial two-year enrollment).

**Table 5. ITT effects for high school and continuing community college students**

Outcome	High School Students				Current Community College Students				Difference
	N	Control Mean	Trt Mean	ITT	N	Control Mean	Trt Mean	ITT	
Initial enrollment									
Any postsecondary	2,533	0.62	0.69	0.07** (0.02)	2,345	0.77	0.70	0.00 (0.02)	0.07*
Any four-year	2,533	0.24	0.22	-0.02 (0.02)	2,345	0.02	0.00	0.00 (0.01)	-0.02
Any two-year	2,533	0.38	0.47	0.09*** (0.03)	2,345	0.75	0.65	-0.00 (0.02)	0.10**
Initial full-time	2,533	0.39	0.45	0.06** (0.02)	2,345	0.46	0.43	0.03 (0.02)	0.03
Degree attainment	2,533	0.08	0.10	0.02* (0.01)	1,724	0.41	0.41	0.02 (0.02)	-0.00
Four-year enrollment	2,533	0.30	0.29	-0.01 (0.02)	1,724	0.35	0.35	0.00 (0.02)	-0.01
Degree attainment OR transfer	2,533	0.10	0.13	0.03* (0.01)	1,724	0.49	0.50	0.01 (0.02)	0.02 (0.03)

NOTES: Clustered robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1. All regressions include randomization block fixed effects. Control covariates include baseline characteristics listed in Table 1.

The subgroup differences are even more notable when looking at the treatment on the treated effects. The take-up rates differed substantially between the two subgroups. Of the 1,434 current community college students in the analytic sample who were offered a spot in the OMD program, 663 enrolled in the program (46 percent). By contrast, only 20 percent of the high school students in the analytic sample offered a spot in the program ultimately enrolled (229 out of 1,133). Assuming the program only affects students who enroll, this means that the already bigger ITT effects that we see for high school students were driven by a smaller portion of the sample than the ITT effects we observe for the current community college students. As such, the treatment on the treated effects for initial enrollment, initial two-year enrollment, initial full-time enrollment, associate's degree completion, and degree completion OR transfer are substantially larger for the high school students in our sample. All of these differences are statistically significant at conventional levels. Interestingly, there is some suggestive evidence that program participation decreases initial four-year college enrollment for high school students, but that this gap decreases three years after randomization. It is also important to note that neither of these estimated effects nor the differences in these effects for high school and community college students are significant at conventional levels.

**Table 6. TOT effects for high school and continuing community college students**

Outcome	High School Students				Current Community College Students				Difference
	N	Control Complier Mean	Taker Mean	TOT	N	Control Complier Mean	Taker Mean	TOT	
Initial enrollment									
Any postsecondary	2,533	0.53	0.90	0.37*** (0.10)	2,345	0.91	0.91	0.00 (0.05)	0.37***
Any four-year	2,533	0.12	0.00	-0.12 (0.11)	2,345	0.00	0.01	0.01 (0.02)	-0.12
Any two-year	2,533	0.39	0.90	0.51*** (0.14)	2,345	0.92	0.91	-0.01 (0.05)	0.52***
Initial full-time	2,533	0.41	0.74	0.33** (0.10)	2,345	0.60	0.68	0.08+ (0.05)	0.26*
Degree attainment	2,533	0.15	0.26	0.11* (0.04)	1,724	0.51	0.56	0.05 (0.04)	0.06
Four-year enrollment	2,533	0.21	0.15	-0.06 (0.12)	1,724	0.42	0.42	0.00 (0.05)	-0.06
Degree attainment OR transfer	2,533	0.15	0.31	0.16** (0.06)	1,724	0.62	0.64	0.02 (0.05)	0.14+ (0.07)

NOTES: Clustered robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1. All regressions include randomization block fixed effects. Control covariates include baseline characteristics listed in Table 1. Of the students who applied to the program when in high school, 229 enrolled in the program. For those who applied while in community college, 663 enrolled.

## Discussion

This paper presents findings from a randomized controlled trial studying the effectiveness of a comprehensive support program designed to help community college students achieve their goal of earning an associate's degree by addressing the systemic financial, personal, academic, and professional barriers they face. We find that the program significantly increases applicants' initial community college enrollment, persistence, and associate's degree attainment three years after randomization. We believe this study contributes to a broader literature demonstrating the effectiveness of comprehensive interventions designed to address the multiple barriers to degree attainment that community college students face just before and during their time in school (Dawson, Kearney, & Sullivan, 2020). By demonstrating the effectiveness of this type of programming in a new setting and with a new management structure (i.e., programming run by a non-profit organization rather than the college itself), we hope to provide evidence regarding alternative approaches to bringing these supports to scale.

The initial enrollment and persistence effects of OMD were of similar and at times even larger magnitudes to those found in a randomized controlled trial of a similar comprehensive program, CUNY ASAP. However, the estimated effect of OMD on degree attainment three years after randomization, while significant and substantively meaningful, were not as large as those of the CUNY ASAP program, which was shown to double the three-year community college graduation rate. It is notable that the counterfactual outcomes in the CUNY ASAP study were lower than in our study. While 19 percent of the CUNY ASAP control group graduated within three years, the control group mean in our study was 22 percent and the control complier mean was 39 percent (Weiss, Ratledge, Sommo, & Gupta, 2019).<sup>3</sup> Notably, the control and control complier mean for students who applied to the program in high school in our study were much lower (8 and 15 percent, respectively), and program effects were largest for these

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<sup>3</sup> Differences in program implementation (i.e., CUNY administers the program directly to its students) resulted in the CUNY ASAP program having nearly perfect program take-up, so the TOT effects from our study are most comparable to the effects estimated in the study of the CUNY ASAP program.

same students. This suggests that the kind of comprehensive supports offered by both programs might be most beneficial for students at greater risk for not graduating.

The difference in results could also signal the limits of programs that are run by outside non-profit organizations rather than by community colleges themselves. As a college-run program, CUNY ASAP could implement institutional changes that may have reinforced the effect of the program itself. For example, they were able to ensure that courses were scheduled so that ASAP participants took many of their core courses together (Cormier, Raufman, & Strumbos, 2020). As an outside organization, OMD has less latitude to make such institutional changes.

Our early findings included some surprises even for the OMD program team. First, the program has traditionally conceptualized its model as a college support and persistence program, rather than a college access program, as the bulk of support services students receive are available only when students arrive on campus. However, the effects of the program on enrollment, driven primarily by high school students, have led the team to rethink what the active ingredients of the program are and when the program treatment truly begins. Once students are accepted into the OMD program, for example, program staff persistently engage with them over the summer, welcome them to the community, and provide supportive nudges to help ensure that they register for classes and submit needed financial aid forms. Further, in order to be fully accepted to the program, prospective students must attend an in-person intake meeting with OMD staff and attend a celebratory OMD Scholar Orientation with other admitted scholars from their cohort. While the program team traditionally viewed these activities as recruitment, the early results from the study have led them to see how high-touch engagement during this transitional period has been essential for ensuring graduating high school seniors have enough support to complete critical college enrollment tasks. By providing resources for students during a period of potential disengagement, OMD serves as a trusted bridge to help ensure that students fulfil their goal of enrolling in college.

Further, engaging high school students has historically been viewed as more challenging for the OMD team. Given lower program take-up rates and lower overall success in college for this group,

program staff were unsure about the magnitude of impact the program would have; however, the findings from our study have led the program team to rethink this assessment and consider how to differentiate the way they serve this unique group of students.

Like any comprehensive program, early evidence of the effectiveness of the OMD program has raised questions about which program component or components are most critical to success. Future work will begin to explore this question, drawing on data from student surveys and college administrative records of service uptake and course-taking patterns. However, the growing body of evidence of comprehensive program effectiveness, relative to the more meager evidence of the effectiveness of programs that address just one barrier students face, suggests that the comprehensive nature of these programs may be critical. As one scholar put it, *“For me, it’s not just one thing, it’s all things. They all seem to work together. Without the development sessions, you wouldn’t have a coach, and everything touches everything. It comes full circle.”* Future work should continue to explore the most effective bundle of services that community college students can access to substantially improve their chances of achieving their goals.

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