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Performance-based aid, enhanced advising, and the income gap in college graduation: Evidence from a randomized controlled trial

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Abstract:

Income gaps in college enrollment, persistence, and graduation raise concerns for those interested in equal opportunity in higher education. We present findings from a randomly assigned scholarship for low-income students at a medium-sized public four-year university. The program focused solely on the first four semesters of enrollment and tied aid disbursements to modest academic benchmarks and enhanced academic advising. Meaningful decreases in time to degree appear to be driven by students with the lowest academic preparation and family income. Treated students took out approximately 20 percent less in student loans during the duration of the program. Participants also indicated high satisfaction with the program's model of enhanced academic advising.

Keywords: enhanced advising, merit-based financial aid, income gaps, college graduation

1. Introduction

Income gaps in college enrollment, persistence, and graduation raise concerns for equal opportunity in higher education. Several studies find that financial aid increases college enrollment and improves early retention for low-income students, yet there is surprisingly little evidence regarding financial aid and degree attainment. This is particularly problematic given low graduation rates for students from low-income families. Twenty-nine percent of 19-year-olds from families in the lowest income quartile enroll in college, yet only nine percent complete college by age 25, for a graduation rate of 31 percent. In the highest income quartile, roughly 80 percent enroll in college and 54 percent earn a degree, for a graduation rate of 66 percent.[1] We are interested in how financial aid and academic advising affects student success in college. To study this, we analyze results from a randomized controlled trial allocating additional financial aid and enhanced academic advising to low-income students at a medium-sized public four-year university in the United States. The goal of the experiment was to generate effective policies to reduce the income gap in college graduation.

Vision Inspired Scholarship through Academic Achievement (VISTA) was part of the national Performance-Based Scholarship (PBS) Demonstration which used random assignment to measure the effectiveness of incentive-based payments on college achievement in several locations across the United States. Over 12,000 college students in six different states participated in PBS interventions, where scholarships varied in duration, funding amounts, and incentives tied to receiving additional aid. In some cases, programs reduced student loan debt, increased college enrollment, encouraged increased course taking, and resulted in modest improvements in college graduation.[2] This paper presents the final follow-up on the New Mexico demonstration which was implemented by MDRC with primary funding from the Bill and Melinda Gates Foundation.[3]

Our analysis builds on earlier work which tracked students five years following randomization. The shorter follow-up in earlier work did not allow for a thorough examination of the

program's effect on college graduation and time to degree. Whereas overall graduation rates for the New Mexico cohort examined were 15 percent within four years, 47 percent within six years, and 54 percent within eight years, previous work at best provided an incomplete picture of the program's true graduation effects.[4] We present updated results tracking students seven years following randomization.

Compared to other PBS demonstrations, the structure of the New Mexico experiment was unique—it is the only of the six conducted exclusively at a four-year university. Other PBS Demonstrations were conducted at community colleges, except for California, where students were provided scholarships that could be used to attend any accredited two- or four-year institution in the state. VISTA tied additional financial aid disbursements to modest academic benchmarks and regular contact with advisers. Recipients were required to maintain a 2.0 GPA, only slightly higher than the 1.7 GPA freshmen needed to remain in good standing and the same as the university requirement for students after freshmen year. The program required that students enroll in 15 credit hours after the first semester, three hours more than the minimum required to maintain full-time status for federal financial aid. Scholarship recipients received enhanced academic advising in the sense that it was higher frequency, more "holistic" in nature, and administered by dedicated academic advisors, with advising appointments prioritized over non-VISTA students. No other PBS demonstration included an enhanced advising component.

Students randomly assigned to the program were significantly more likely to earn the minimum number of credits required for VISTA eligibility (i.e., 12 credit hours in the first semester, 15 credit hours in the second through fourth semesters) compared to the control group. This led to a modest and imprecisely estimated increase in credit hours by the end of the second, and final, year of the program. The program had significant effects on timely graduation: it boosted the percent of

students who graduated in nine semesters by 5.4 percentage points (24 percent) and the percent of students who graduated in ten semesters by 5.1 percentage points (15 percent). These improvements reduced the income gap in graduation and were driven by students in the lower half of the high school grade distribution and students from the lowest-income families. In addition to reductions in time to degree, results from a follow-up survey indicated that VISTA students were significantly more satisfied with the advising they received relative to non-VISTA students. Students receiving additional financial aid took out fewer loans but ended up working more hours during college. Importantly, because receipt of the scholarship was conditioned on receiving enhanced academic advising, we are not able to distinguish whether treatment effects were driven by enhanced advising, additional financial aid, or some combination thereof. Results from focus groups and a follow-up survey aid in assessing the effectiveness of enhanced academic advising.

The remainder of the paper proceeds as follows: section two discusses the scientific literature on financial aid, academic advising, and college graduation; section three details the research design and data; section four presents results; section five summarizes the mechanisms through which VISTA may affect student outcomes; section six concludes with policy implications.

2. (Quasi-)Experimental Literature on Aid, Advising, and Graduation

2.1 Financial Aid and College Graduation

Until relatively recently, there have been few studies of financial aid and college outcomes beyond enrollment. As Castleman and Long (2016) note, the relatively small number of studies is partially due to the longer follow-up required to track students to completion—often six years or longer. Endogeneity is another impediment to estimating the effects of financial aid on college graduation. Students qualifying for merit-based aid may have better academic preparation and thus may be more likely to graduate in the absence of aid, for example. Students qualifying for need-based

aid have fewer financial resources and may be more likely to have attended lower-quality high schools. Without randomizing financial aid eligibility, it is difficult to distinguish the impact of financial aid on graduation from other (often unobserved) characteristics that influence student success in college, such as soft skills, expectations, social and family support systems, and so on.

Due to a recent shift from need-based to merit-based financial aid in the United States, several studies exploit presumably exogenous variation in financial aid based on state residence. A handful of studies using state-level data have failed to find meaningful population graduation effects of state merit scholarships (Dynarski, 2008; Sjoquist and Winters, 2012a, 2012b; Jia, 2019). In contrast, studies using administrative data at the university- or university-system-levels have found mixed evidence regarding the relationship between state merit-aid and college graduation (Bruce and Carruthers, 2011; Scott-Clayton, 2011; Cohodes and Goodman, 2014; Scott-Clayton and Zafar, 2019; Author, 2020). Evidence from administrative studies suggest that it may only be stronger students that respond to merit requirements. For example, Scott-Clayton (2011) and Scott-Clayton and Zafar (2019) found evidence of reductions in time to degree for students just above an ACT cut-off for West Virginia's PROMISE scholarship program, compared with students just below. Using a similar strategy, Bruce and Carruthers (2011) found no program effect for Tennessee's lottery scholarship. The discrepancy between these two studies may arise from differences in student characteristics. Because of differences in program requirements, all students in the West Virginia sample had high school GPAs of 3.0 or higher and all students in the Tennessee sample had high school GPAs below 3.0.[5] Other studies support the idea that only stronger students may benefit from merit-based aid. For example, Author (2020) estimated the impact of New Mexico's state merit scholarship on college completion, finding no overall completion effect of the program. Instead, results suggested a

divergent effect—graduation rates increased for students with better academic preparation and decreased for less academically-prepared students.

Numerous studies focus on the relationship between financial aid and graduation for low-income students. Studies generally point to positive effects of need-based financial aid on college completion. Large-scale need-based grant appear to increase graduation rates and decrease time to degree (Castleman and Long, 2016; Bettinger *et al.*, 2019; Denning *et al.*, 2019). Other studies find that need-based grants do not have an impact on overall graduate rates but do result in some students graduating faster than they otherwise would (Goldrick-Rab *et al.*, 2016; Mayer, Patel, and Gutierrez, 2016).[6] A subset of the literature on need-based financial aid examines changes to aid when students are relatively far along in their college studies (i.e., senior year or later). In this small but growing body of literature, at least one study shows that college seniors graduate earlier when financial aid is increased near the end of their studies (Denning, 2019). Others, however, find that increases in the net price of continuing college beyond "normal time" reduce time to degree (Garibaldi *et al.*, 2012; Mabel, 2020).

2.2 Academic Advising and College Graduation

Under VISTA, disbursement of financial aid was contingent upon students meeting with their advisers up to three times per semester. Administrators at the study institution identified academic advising as a key component in getting students on track to graduate. Just before the study, the average graduate at the study institution had accumulated 140 credit hours, 12 more than required for a bachelor's degree.[7] It was widely perceived that better advising would help students reduce or eliminate inefficient credit hours, thereby reducing time to degree. Another goal of the advising component was to connect students to available on-campus support for nonacademic challenges, including financial setbacks and other emergencies. It was expected that a stronger connection to

advisers would improve students' sense of belonging and increase their affinity for the institution (Ackerlof and Kranton, 2002).

Similar to financial aid, the lack of exogenous variation in academic advising poses a challenge for establishing a robust evidence base (Karp, 2011). Students who receive more advising may be systematically different from those who receive little or no advising. Advising services vary with the type and selectivity of the college and are thus likely to be associated with other factors that impact college achievement such as student characteristics and instructional resources. Students who seek out advising are likely to be more committed to completing college and may be more likely to take advantage of other available resources, such as tutoring. It is therefore difficult to separate advising from other services and from individual characteristics. As a result, scientific literature on academic advising is relatively sparse at the college-level. There is, however, evidence that pairing additional financial aid with increased academic support can improve grades, student persistence, and degree completion rates (Angrist, Lang, and Oreopoulos, 2009; Page *et al.*, 2017), and that individualized student coaching for older, nontraditional students increases college persistence and graduation (Bettinger and Baker, 2014).

Most of the literature on academic advising is at the high school-level, yet it is worth briefly summarizing here.[8] As VISTA students are young, traditional college entrants, academic advising may help them in ways similar to high school seniors. There is evidence that college counseling in high school has meaningful benefits across several postsecondary outcomes, especially for high achieving, low-income students. Additional access to college counseling has been shown to increase enrollment rates at four-year universities (Seftor, Mamun, and Shirm, 2008; Bettinger *et al*., 2012; Bos *et al.*, 2012; ; Carrell and Sacerdote, 2013; Horng *et al*. 2013; Hurwitz and Howell, 2013; Stephan and Rosenbaum, 2013; Oreopoulos, Brown, and Lavecchia, 2017). Counseling has also been shown

to increase financial aid applications, prompt more students to enter college directly after completing high school, and increase the selectivity of schools attended (Seftor, Mamun, and Shirm, 2008; Sherwin, 2012; Avery, 2010, 2013, 2014). Receipt of college counseling appears to increase persistence, especially for low-income and first-generation students (Barr and Castleman, 2017; Castleman and Goodman, 2018). Evidence suggests that "summer melt," occurring when spring high school graduates get admitted to college but fail to enroll in the fall, may be reduced by providing college counseling over the summer period (Castleman and Page, 2014, 2015; Castleman, Page, and Schooley, 2014).

2.3 Contribution to the Literature

Our examination of the VISTA experiment is well-positioned to make a significant contribution to the literature. As far as the authors know, it is the first study randomizing aid and enhanced academic advising solely to low-income students at a public four-year university. Other experimental studies of academic advising and financial aid do not exclusively target this demographic. For example, although other PBS Demonstrations were randomized with eligibility limited to low-income students, they took place at community colleges and were not targeted at freshmen aged 17-20.[9] Other studies randomizing additional advising and financial incentives are not directly comparable because they were either not focused on low-income students, were not focused on traditional students, or both (Angrist, Lang, and Oreopoulos, 2009; Bettinger and Baker, 2014).[10]

Another distinguishing feature of VISTA is its focus on "enhanced" academic advising. By enhanced we mean that VISTA advising was high frequency (i.e., three visits were required per semester to receive the maximum award); provided by an advisor trained in offering support with academic, financial, and situational challenges that may arise during college; was administered by a dedicated advisor; and VISTA students were given priority in both walk-in sessions and setting

appointments online. There are few (quasi-)experimental studies on such models of academic advising (see Page *et al.*, 2017 for one exception).

3. Research Design

VISTA was implemented at the University of New Mexico (UNM), a medium-sized, four-year public research university that enrolled over 18,000 undergraduate and 5,000 graduate students on its main campus during the program period of 2008-2010.[11] Reflecting New Mexico's demographics, the majority of students belong to minority groups, and the university is a United States Department of Education-designated Hispanic-Serving Institution.[12] Generous admissions policies result in very high rates of acceptance and low graduation rates compared with other research universities.

To place UNM in the larger context of higher education in the U.S., Table 1 provides a demographic and academic comparison of all first-year students at UNM, those first-year students eligible for a federal need-based Pell Grant at the university, and four-year public college students nationally just before the study began. The study institution is clearly distinguished by its high enrollment of minority students. Hispanic students constituted 38.4 percent of entering freshmen, compared with the national average of 9.4 percent for four-year colleges. American Indians constituted 4.6 percent of entering freshmen, compared with 0.1 percent nationally. Nevertheless, students at the study institution were typical among public college students nationally in terms of ACT scores and second-year retention. Graduation rates at UNM are relatively low, not uncommon for a public institution with generous admissions criteria (Bound, Lovenheim, and Turner, 2010).

Pell-eligible students trailed their more affluent peers on all academic measures except high school GPA. For students who remained enrolled, a smaller proportion of Pell-eligible students took enough credit hours to make timely progress toward earning a degree. Pell-eligible students trailed all

students on this measure by eight to nine percentage points in the first four semesters. Not surprisingly, the six-year graduation rate for Pell-eligible students was eight percentage points lower than the graduation rate for all students.

The VISTA scholarship program aimed to address lagging college outcomes and substantial unmet need for low-income students by providing up to $1,000 in additional financial aid in each of the first four semesters, in increments tied to academic milestones and with payments made directly to students. Financial aid disbursed through VISTA was neither first- nor last-dollar and did not consider the student's unmet need. The two-year term of the program was designed to stave off the high rate of attrition between the first and second years of college and to help students accumulate enough credits early on to enable them to earn a degree in a timely fashion. Students received $250 for registering for 12 or more credit hours in the first semester and for 15 or more credit hours in the second through fourth semesters; $250 for earning a 2.0 or higher GPA at mid-term; and $500 for completing the required hours with a 2.0 or higher GPA. A student received the registration and mid-term payments only after meeting with a dedicated academic adviser who confirmed the student had met the milestones. VISTA students could thus receive up to $1,000 per term if they met all of the program benchmarks.

These requirements were only slightly more stringent than those for the Pell Grant. At the time of the program, the university defined satisfactory academic progress as a 1.7 GPA for the first 30 credit hours earned, and a 2.0 GPA thereafter. Moreover, full-time status for federal financial aid purposes required only 12 credit hours per semester. Yet a student who registered for 12 credit hours per semester needed 11 semesters (five and a half years) to earn the 128 credit hours required for graduation.[13] VISTA thus rewarded students for making timely progress toward graduation. Students who accumulated 12 credit hours in the first semester and 15 credit hours in each additional semester

could graduate in nine semesters (four and a half years). The payment schedule and the fact that payment was contingent on meeting with an adviser encouraged students to stay on track during the semester and interact with their academic advisers.

As mentioned before, advising services offered to VISTA students differed from those offered to the general student population (including the control group) in three ways. First, VISTA students were assigned to one adviser for the duration of the program. Control group and other students could request to see a particular adviser, but during the study period they typically saw whoever was first available. According to UNM officials, this was the norm for freshmen advisement for large public colleges at the time. Although VISTA advisers did not have smaller caseloads *per se* (since no adviser had any particular caseload), VISTA students were given priority to see their assigned advisers when they came into the advising office and when making appointments online. As walk-ins, they were put to the front of the line. Online, there were specific time blocks they had priority in reserving in advance. As a result, advisers were much more likely to get to know their VISTA advisees since they saw them consistently and more frequently. Note that there was very little turnover in trained VISTA advisors over the duration of the program—one advisor that left the university shortly after the program's inception, and this individual's students were assigned to the remaining VISTA advisors. Second, advisers got to know the VISTA students better, and they were trained to provide holistic advising, which involves learning about—and potentially providing referrals for—nonacademic aspects of a student's life, such as health, work, and family issues.[14] Third, VISTA students were encouraged (indeed, given incentive) to meet with their advisers three times during the semester: at registration, midterm, and at the end of each term to register for the next semester. Control group and other students typically only met with an adviser at the end of the semester in order to register for the next semester. Toward the end of each semester, advisers see

literally hundreds of students, and thus advising sessions are necessarily shortened and are much less likely to include any holistic components.

The VISTA program was explicitly designed to benefit students who fell below the 2.5 GPA required for the state's lottery-funded scholarship. However, VISTA also provided incentives for students who had a rough start in college to keep trying, providing them payments in any of the four semesters that they met the requirements. To illustrate, a VISTA student who failed to meet eligibility requirements in the first two semesters of college could still earn the full $1,000 in aid during both semesters three and four. This structure contrasts with the more stringent rules of state lottery-funded scholarships, which once lost cannot be regained.

Random assignment of 1,081 eligible students took place at the first-year student orientation sessions for incoming freshmen in 2008 and 2009. All entering students attend these two-day sessions, which take place weekly over the summer. Students were eligible for the study if they were state residents, had completed the FAFSA, and were eligible for a Pell Grant.[15] A financial aid officer identified these students and sent them letters before their scheduled orientation session. They attended a separate VISTA scholarship session during their orientation. In the VISTA session, students learned about the study, signed an informed consent form if they were willing to participate, and filled out a baseline survey. Once the surveys were completed and submitted, students were randomly assigned to either research group based on a computer algorithm. The treatment and control groups consisted of 536 and 545 students, respectively.

Our analysis relies primarily on two sources of data: (1) the baseline survey, which included student-provided information on parental education, employment status, marital status, primary language spoken in the home, and (2) registration and financial aid data from the institution's administrative records. We also examined data from an internet survey of the second study cohort

(those who entered college in 2009), fielded in the spring of the cohort's first academic year. The survey asked about student experiences in the first semester of college, including participation in extracurricular activities, employment, study habits, and academic advising. Of the 594 students invited to participate in the survey, 388 responded, for a response rate of 65 percent. Because of the potential for sample nonresponse bias, data should be interpreted cautiously.

Finally, we make use of a qualitative evaluation of program implementation, which included interviews with VISTA program coordinators and academic advisers and data from three focus group interviews with 19 students in the VISTA group and 12 students in the control group. Interviews with program coordinators and advisers indicated that key components of VISTA were implemented successfully—in particular, recruiting and signing up eligible students for the program, deploying academic advisers to regularly communicate with their assigned VISTA advisees, and distributing scholarship payments to students who met program milestones. Once VISTA program coordinators enrolled eligible students in the program, advisers reached out to their advisees multiple times via e-mail, phone, or social media sites to remind them of their upcoming milestone deadlines and to schedule their required advising appointments.

Table 2 presents data for each research group, drawn from the baseline survey and administrative records. Just over 60 percent of the sample was female, which reflects the Pell-eligible population in general at the university. Since the program targeted first-time entering freshmen, nearly all of the students were 17 to 18 years of age. About 60 percent of the students were Hispanic and seven percent of the students identified as American Indian. Average parental income was below $30,000. In terms of academic performance, the students appeared to be relatively well prepared. Nearly 40 percent had a high school GPA of 3.5 or higher and the average ACT score was 21, which matches the average among all test takers nationally.[16] About a third of the students reported that they

were the first in their family to attend college. Finally, about half of the students were working at the time they entered the study.

The two research groups could not be distinguished by any of the 23 characteristics that were subjected to statistical testing.[17] Taken as a whole, the characteristics listed in Table 2 do not jointly predict assignment to the VISTA group, suggesting that a simple comparison of means provides a valid estimate of the program's effect. Nevertheless, in order to improve the precision of estimated average treatment effects, we include covariates in ordinary least squares and linear probability models of the form:

(1) $y_i = \alpha + \tau VISTA_i + \boldsymbol{X}_i\boldsymbol{\beta} + \varepsilon_i$

where y_i is a registration, grade, or degree attainment outcome, and $\boldsymbol{X}_i$ is a vector of controls which are expected to be strongly associated with student outcomes in college, including gender, race and Hispanic origin, mother's and father's education levels, employment status at baseline, language spoken at home, high school GPA, ACT composite score, and family income for student *i*. For brevity, we do not report unadjusted results as including covariates in an RCT regression can only serve to increase the precision of the estimator for average treatment effects in large samples.[18] The variable $VISTA_i$ takes the value of one if the student is in the treated group, and zero otherwise. $\hat{\tau}$ provides our estimate of the average treatment effect, which is interpreted as the intention-to-treat. We ignore noncompliance and sample attrition after randomization, thus $\hat{\tau}$ is considered a conservative estimate of the true treatment effect.

Because we test for many hypotheses, we are concerned that multiple testing may result in an unacceptably large number of false positives (i.e., rejections of null hypotheses that are false). Thus, in addition to commonly accepted levels of statistical significance, we report significance levels using a false discovery rate procedure controlling for the expected proportion of Type I errors following

Benjamini and Hochberg (1995). Similar hypotheses are grouped together. As an example, Table 3 tests for enrollment effects after each of the seven years of follow-up, so $N = 7$ in our procedure to adjust *p*-values for multiple testing.

4. Effects of VISTA on Academic Progress

Table 3 through Table 5 present the effects of VISTA on academic progress. Table 3 shows that the program did not improve enrollment retention in the first five years after study entry.[19] Note that point estimates are consistently negative, which may indicate that the more stringent rules of VISTA may have induced some students to drop out. If so, it is likely on a small scale as evidenced by imprecisely estimated treatment effects. Table 4 presents estimates on course-taking behavior. The program created large differences in the likelihood of earning the minimum number of credits required to earn the full VISTA award measure in the first and second year. VISTA students were nine percentage points (15 percent) more likely to earn at least 27 credits in the first year, and 13 percentage points (37 percent) more likely to earn at least 30 credits in the second year. We interpret this as evidence that VISTA students responded to financial incentives by taking larger credit loads in the first two years. This information is visually displayed in Figure 1. Despite this, VISTA students exhibited no meaningful increase in overall credits earned in either the first or second year of the program compared to non-VISTA students. Figure 2 shows that VISTA students earned higher average credits per semester than non-VISTA students over the length of the program, although differences are not significantly different from zero. The expectation that students would be more likely to continue to carry a 15 credit hour load after the conclusion of the program was not realized. As shown in Table 4, VISTA students were no more likely than control group students to earn 15 credit hours or more in subsequent years. The change in the distribution of credit hours resulted in a small (and only marginally significant) effect on credits attempted. In the first year, VISTA students

attempted 0.8 more credit hours than control group students. Despite their heavier course load, VISTA students had the same pass rate and GPA distribution as control group students (not shown), suggesting that the increase in credit hours earned was due largely to an increase in credit hours attempted. Nonetheless, focus group data suggest that taking additional credit hours was a burden for students. Some students who participated in the focus groups said that it was difficult managing the time needed to meet the 15 credit hour requirement in the second semester. This extra work led to additional pressure and stress, particularly for students who had jobs. The VISTA advisers corroborated the students' sentiments about transitioning from 12 to 15 credit hours; according to one adviser, adding an additional class to an already busy schedule—that for many included work—was a serious challenge.

Table 5 presents data on degree attainment. VISTA did not significantly increase four-year graduation rates for program participants, although there were statistically meaningful increases in later periods. Specifically, the likelihood of completing a degree within four and a half years (nine semesters) increased by 5.4 percentage points (or 24 percent) for the VISTA group relative to the control group. This is indicative of program efficacy, since the minimum credit requirement of VISTA put students on a track to graduate in four-and-a-half years. The graduation rate within five years (10 semesters) increased by 5.1 percentage points (or 15 percent). These program effects represent a large share of the university's previously measured eight percentage point income gap in graduation. The program effects are also very similar to the 4.6 percentage point increase in six-year graduation rates reported by Castleman and Long (2016) for the FSAG program. However, similar to Scott-Clayton (2011) and Mayer *et al.* (2016), completion effects are imprecisely estimated at later semesters, suggesting that VISTA reduced time to degree without affecting graduation rates overall. Nevertheless, and as we discuss later, there are significant benefits from reducing time to degree.

Effects by Family Income and High School GPA

We also examined the effects for students according to their family income and high school GPA. Lower income, Pell-eligible students might be most responsive to the scholarship program if, for example, they were more responsive to financial incentives to progress in school, or if the effects of additional aid were larger for those with lower incomes. Academic preparation at college entry might also affect responsiveness to the program, although it is not obvious which students would respond more. While more-prepared students might find it easier to respond to the program's incentives by taking and passing more credit hours (as appears to be the case in Leuven *et al.*, 2010, Scott-Clayton 2011, and Castleman and Long 2016), less-prepared students might benefit more from the enhanced, personalized advising offered by the program.

Table 6 shows program effects for students above and below the median high school GPA for the study group, and above and below the median family income for the study group. Larger program effects for students in the lower part of the distributions, particularly for high school GPA, appear to be driving the overall effects shown in Tables 4 and 5. For example, less academically prepared VISTA students earned seven percent and ten percent more credits during the first and second years of the program, respectively. Lower income VISTA students attempted four percent more credits during the first year of the program. Importantly, when we split the sample by academic preparation and family income, effects are imprecisely measured, and none approach significance after adjusting for multiple testing. Statistical power may also contribute to this finding.

5. Exploring Mechanisms for the Program Effect

It is admittedly complicated to interpret the mechanisms behind a financial aid experiment simultaneously randomizing a package of financial aid incentives and enhanced academic advising. Some results are salient: VISTA students took higher course loads during the program, graduated

earlier, took out fewer student loans during the program, and were more satisfied with their academic advising. However, interpreting results regarding student engagement and labor market effort require more nuance.

Theoretical expectations regarding the labor market efforts of VISTA students were *ex ante* ambiguous. On one hand, financial constraints are likely binding for Pell-eligible students, so additional financial aid may result in more time spent studying and engaging in extracurricular activities, and less time spent working. On the other hand, if low-income students are loan averse and have legitimate concerns over scholarship loss, then perhaps working more during the first semester makes sense. Results indicate that VISTA students worked 3.3 more hours per week relative to the control group, a result not counterbalanced by a decrease in time spent studying. VISTA students were less likely to engage in extracurricular activities and saw their advisors more often. These results invoke the question as to whether financial aid for low-income students provides them more time to study. Our results suggest that low-income students worked the same, if not more, hours per week and were less likely to engage in extracurricular activities as a result of receiving additional financial aid.

We do find evidence that VISTA group students carried less debt than students in the control group. As shown in Table 7, financial aid packages for program students were $1,062 and $861 more than the packages for control group students in the two program years, reflecting both the VISTA award and reduced borrowing. VISTA group students borrowed about $300 less than control group students in each program year.[20] Once the two-year eligibility period ended, the size and composition of the financial aid packages received by the VISTA students and the control group students were very similar.

Where the survey does indicate significant differences is in responses to questions about academic advising. Program group students were more likely than control group students to report that advising about their majors and careers and developing academic plans were somewhat or very important when meeting with their advisers, and they reported more (although shorter) advising sessions and greater satisfaction with the advising services. In particular, program group students were 13 percentage points more likely than control group students to agree or strongly agree that "My adviser helped me take on more responsibility for my academic career" (70 versus 57 percent), 14 percentage points more likely than control group students to express satisfaction with the amount of time spent meeting with an adviser (83 verses 69 percent), and 20 percentage points more likely than control group students to agree or strongly agree that "Interactions (meetings, phone calls, e-mails, etc.) with my adviser were helpful" (79 versus 58 percent).

In interpreting the survey results, it is important to consider potential biases. One source of bias may be introduced by sample selection. As mentioned earlier, the overall response rate to the online survey was 65 percent. The response rate was higher for the VISTA group, at 68 percent, compared with the control group, at 63 percent. We would expect that more engaged students would be more likely to respond. The bias, however, would work against finding differences between the groups, since the control group respondents are likely to be even more engaged than program group respondents, who are more familiar with, and therefore more likely, to respond to requests concerning the program. This is consistent with the higher level of engagement in extracurricular activities reported by control group respondents.[21]

Students in the program group who participated in the focus groups reported that the advising was the most valuable component of VISTA. Nearly all of these students expressed appreciation for the opportunity to develop sustained relationships with their advisers that continued throughout the

two-year program. According to these students, VISTA advisers provided both academic and emotional support, support that would not have otherwise been available to them on campus.

Advisers also communicated the value of cultivating ongoing relationships with students in the VISTA program. One adviser noted that the program allowed her the time needed to convey the importance of taking more credit hours and persisting term to term to her students, many of whom would not have done so otherwise. Other advisers said that struggling VISTA students who took advantage of the advising services were able to transition off academic probation. Advisers also assisted students on probation by encouraging them to enroll in summer or winter intersession courses and to reduce their work hours or extracurricular activities in order to spend more time in the tutoring centers or studying.

Staff also credited the program with helping students take advantage of other campus resources, such as the tutoring centers, the student health center, and the career center. Many students accessed these resources because their VISTA advisers had referred them. As one VISTA student shared, "being in VISTA helps us [students] get services and information all in one place."

6. Concluding Remarks

Results suggest that VISTA did not increase the overall likelihood of obtaining a degree, but did help some students obtain degrees in a more timely manner. The savings to both students and the university from reducing the time to a degree are substantial: each additional year in school is expensive in terms of direct costs of attendance and foregone wages. A formal benefit-cost analysis is beyond the scope of this paper, however a rough estimate of costs can be calculated using the average VISTA scholarship received per student ($2,576 over four semesters) plus the additional costs of enhanced advising. If we assume a total cost per student of $3,000, then the cost per additional degree earned is roughly $59,000 (or $3,000 divided by the 0.051 increase in degree receipt by the tenth

semester). This amount should be compared with the increase in expected lifetime earnings from obtaining a college degree versus only some college, and with the benefit of completing a degree in five rather than six years. For the former comparison, the program clearly passes the benefit-cost test. For the latter, the program cost is similar to at least one estimate of the cost of delaying graduation by a year (Abel and Dietz, 2014).

Our analysis of the VISTA program suggests that tying additional aid to enhanced advising and a heavier course load can make a big difference in narrowing the income graduation gap. The combination of encouraging students to attempt 15 or more credit hours per semester and providing enhanced advising appears to have helped students make greater progress toward graduation. We find it particularly encouraging that the improvement in graduation rates was driven by students in the lower half of the high school GPA distribution, especially since positive outcomes in other programs reported in the literature are concentrated among those with better academic records. What distinguishes VISTA from these other programs is the incentive to make use of enhanced advising, which may be particularly helpful for students with weaker academic preparation. It is possible that comparable effects might occur for students offered a program with the same structure concerning requirements and advising, but with smaller grants. The promising outcome from VISTA should encourage colleges to experiment with similar programs.

Notes

[1]Figures are from Bailey and Dynarski (2011), who use 1979-1982 birth cohorts from the NLSY-1997.

[2]A summary of results for all PBS demonstrations is given in "Designing Scholarships to Improve College Success: Final Report on the Performance-Based Scholarship Demonstration" published by MDRC, online at https://www.mdrc.org/publication/designing-scholarships-improve-college-success.

[3]A preliminary working draft based on the first five years of follow-up exists on MDRC's website at https://www.mdrc.org/sites/default/files/PBS_New-Mexico.pdf.

[4]U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2016, GR200_16 (Graduation rate data, 200% of normal time to complete - cohort year 2008 (4-year) and cohort year 2012 (less-than-4-year) institutions). Retrieved from https://nces.ed.gov/ipeds/datacenter/cds.aspx on 18 June 2020.

[5]Because Scott-Clayton did not limit the sample to students who took the ACT only once, her marginal program students could have manipulated their test scores by re-testing. These students would differ in unobserved characteristics, such as ambition, from those who were below the cutoff and did not re-test. But even though Bruce and Carruthers limit their sample to students who took the ACT only once, they faced a similar situation: students just below the cutoff sample who did not retest might contain a higher proportion of students with low ambition, relative to those just above the cutoff who had less incentive to retest. Thus, selection alone is unlikely to explain the discrepancy between the studies.

[6]Goldrick-Rab *et al.* (2016) find that a $3,500 increase in need-based financial aid increases grades and improves the likelihood of graduating within four years by 29 percent. Because the authors only report graduation out to four years post-randomization, it is impossible to know

whether estimated treatment effects at 150% of normal time (i.e., six years) are statistically significant. If not, results are suggestive of a reduction in time to degree without a meaningful change in the overall graduation rate.

[7]For an overview of the literature on college counseling and postsecondary outcomes see Avery, Howell, and Page (2014).

[8]This figure applies to students who entered the study institution without any advanced placement credits and who earned at least 128 credit hours in residence.

[9]PBS Demonstrations in Arizona and Florida even required students complete additional advising and/or tutoring requirements to receive the maximum financial aid award. However, the eligible population for the Arizona demonstration was Hispanic males with fewer than 45 credits earned and the eligible population for the Florida demonstration was students aged 18+ with a need for developmental math courses.

[10]Specifically, Angrist, Lang, and Oreopoulos (2009) was not limited to low-income students. In Bettinger and Baker (2014) only about one quarter of students were eligible for the Pell Grant and the average age of participants was approximately 31 years.

[11]The institution's Carnegie Classification is RU/VH, which indicates "very high research activity."

[12]This designation, according to which Hispanic students comprise 25 percent or more of the undergraduate student body, means that the institution is eligible for federal grants that aim to expand educational opportunities for Hispanic students.

[13]This number was the credit requirement for graduation at the time of the study. The credit requirement was reduced to 120 credit hours for several majors in the 2014-2015 academic year.

However, students who had been admitted to their degree-granting major and college before the change remained bound to the credit requirements in place at the time the major was declared.

[14]If enhanced advisors inadvertently adjusted their practices in treating Non-VISTA students then estimated treatment effects would be biased. However, this would likely result in attenuation of point estimates.

[15]85.8 percent of students awarded the federal Pell Grant in the 2008-2009 academic year had family incomes less than or equal to $40,000 (2009 USD).

[16]ACT, http://www.act.org/news/data/08/states.html.

[17]Testing this many covariates usually results in at least one false positive at the five percent-level. However, we note that the likelihood of at least one false positive significant at the five percent-level is $(1 - .95^{23}) = .693$. T-tests were not conducted on ACT percentile rank scores.

[18]This result is proven in Imbens and Rubin (2015, p. 128).

[19]Effects on academic progress were estimated using transcript data from the university, which includes data on credit hours and grades from classes taken on the main campus as well as from classes taken at affiliated community colleges that counted toward a degree.

[20]This reduction in loans was, in a few cases, initiated by the financial aid office. In these cases, financial aid awards received by VISTA group students left less than $1,000 per semester remaining in unmet need. The university was prohibited from offering financial aid in excess of a student's financial need, or the difference between the estimated cost of attendance and the FAFSA-determined EFC. In those few cases, the students' loans were reduced so that the student could receive the full VISTA scholarship. However, other analyses (not shown) suggest that the loan reduction was not all "automatic" repackaging by the financial aid office. The VISTA

program also led to a reduction in loans among students who entered the study with relatively high unmet need, and who had $1,000 or more in unmet need even with the VISTA funds.

[21]A second source of bias could be from survey response effects, which are variations in responses to due seemingly innocuous features of the survey's design and administration (Zaller and Feldman, 1992). It is difficult to sign this potential source of bias, and caution is urged in interpreting survey results.

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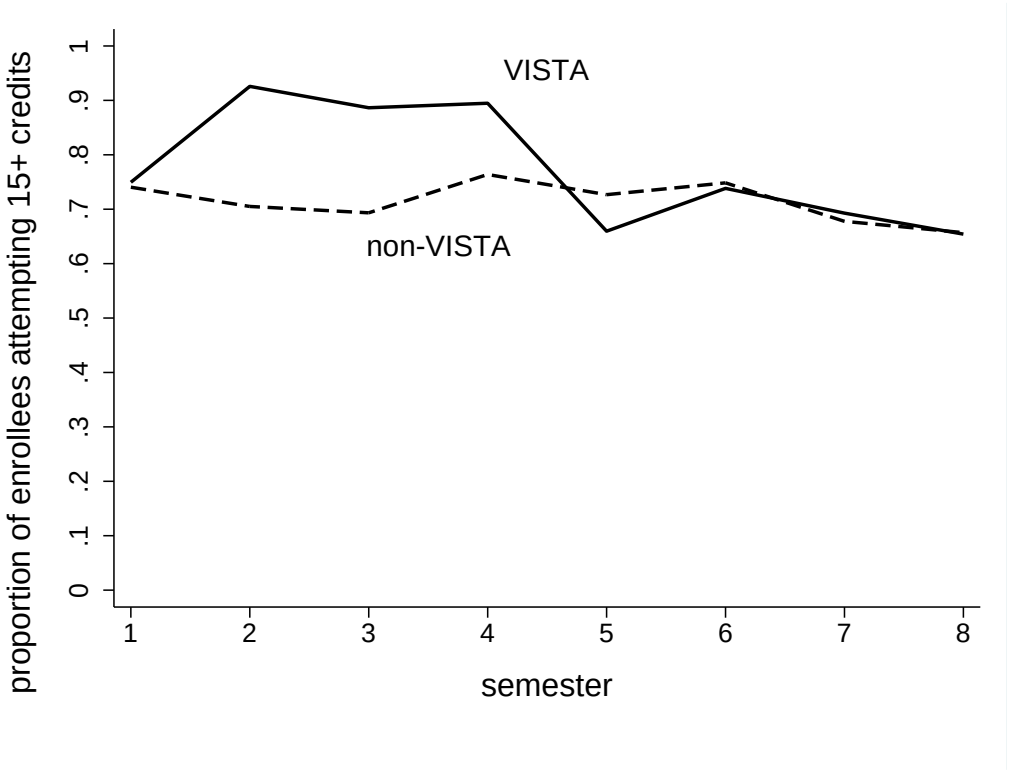
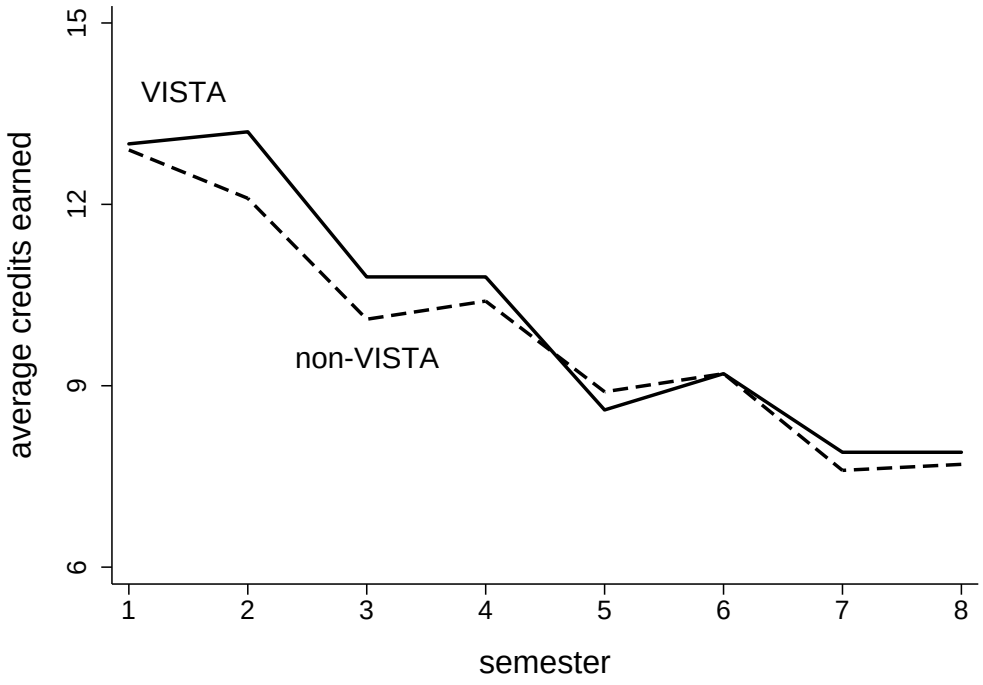


Source: University of New Mexico transcript data. Effects are estimated using a regression model that controls for the following student characteristics: gender, race/ethnicity, mother's and father's education levels, current employment, language spoken at home, high school GPA, ACT composite score, and family income.

Figure 1. Proportion of enrollees attempting 15 or more credits, by semester and treatment status



Source: University of New Mexico transcript data. Effects are estimated using a regression model that controls for the following student characteristics: gender, race/ethnicity, mother's and father's education levels, current employment, language spoken at home, high school GPA, ACT composite score, and family income.

Figure 2. Average credits earned by semester and treatment status

Table 1. Characteristics of incoming freshmen at UNM and all four-year public colleges

characteristic	2006-2007 all UNM entering freshmen	2006-2007 UNM Pell Grant-eligible	2004 all 4-year public college entering
Pell Grant-eligible	.205	1.000	.355
female	.561	.595	.575
age	18.6	18.5	-
race/ethnicity			
Hispanic	.384	.522	.094
white	.458	.280	.668
black	.028	.036	.114
Asian or Pacific Islander	.039	.050	.066
American Indian	.046	.072	.001
ACT English			
25th percentile	18	16	18
75th percentile	25	23	24
ACT math			
25th percentile	18	17	18
75th percentile	24	23	24
high school cumulative GPA			
3.5-4.4	.391	.385	-
3 to less than 3.5	.332	.347	-
2 to less than 3	.241	.248	-
no GPA available	.036	.018	-
placed in remedial English, reading, or math	.431	.564	-
retention to fall semester year 2	.743	.702	.726
retention to fall semester year 3	.583	.543	-
progress toward degree (those still registered)			
semester 1	.670	.582	-
semester 2	.515	.417	-
semester 3	.500	.410	-
semester 4	.428	.350	-

six-year graduation rate (00-02 freshmen)	.425	.345	.446

Source: Office of Institutional Research, UNM; National Center for Education Statistics' Integrated Postsecondary Education Data System. Entering UNM freshmen numbered 3,026 in 2006 and 2,910 in 2007. Distributions may not add to 100 percent due to rounding or students declining to provide race/ethnicity. The median test taker graduating from high school between 2008 and 2010 earned a 20 in both the English and Math sections. The 25th percentile score was 15 for English and 16 for Math and the 75th percentile score was 24 for both subjects. Progress toward degree indicates those earning at least 12 credit hours per semester with a minimum 2.0 cumulative GPA.

Table 2. Baseline characteristics of VISTA recipients and non-recipients

characteristic	treatment group	control group
female	.614	.602
age distribution		
17-18	.944	.930
19-20	.056	.070
one or more children	.017	.018
race/ethnicity		
Hispanic	.602	.610
white	.215	.222
black	.032	.022
Asian or Pacific Islander	.032	.039
American Indian	.069	.068
other	.050	.039
ACT English		
25th percentile	16	17
75th percentile	24	23
ACT math		
25th percentile	16	17
75th percentile	23	23
high school cumulative GPA	3.3	3.3
3.5-4.4	.397	.367
3 to less than 3.5	.326	.350
2 to less than 3	.244	.248
no GPA available	.032	.035
non-English language spoke commonly at home	.208	.232
first person in family to attend college	.321	.335
diplomas/degrees earned		
high school diploma	.972	.983
GED certificate	.019	.007
other	.013	.011
currently working	.494	.485
average hourly wage ($)	8.2	8.3

plans to live on campus	.418	.440
parents adjusted gross income ($)	29,238	28,774
sample size	536	545

Source: data from MDRC calculations using the Baseline Information Form, UNM placement test and high school transcripts, and FAFSA filings. The p-value from a regression of research status on baseline characteristics was .185. Two-tailed t-tests indicated no significant differences between treatment and control means at the five percent-level. Distributions may not add up to 100 percent due to rounding. ACT outcomes reflect percentile scores—t-tests of significant differences are not conducted using these figures.

Table 3. Effects of VISTA on enrollment

outcome	control mean	ATE (SE)
enrolled in any term during the year (%)		
year 1	.989	-.006 (.007)
year 2	.823	-.031 (.024)
year 3	.701	-.020 (.028)
year 4	.640	-.019 (.029)
year 5	.517	-.023 (.031)
year 6	.310	-.025 (.028)
year 7	.199	.013 (.025)

Source: UNM Office of Institutional Research. Average treatment effects (ATE) are the covariate-adjusted difference between treatment and control groups. A two-tailed t-test was applied to differences between the research groups. ***, **, and * denote statistical significance at the one, five, and ten percent, respectively. †††, ††, and † denote statistical significance after adjusting *p*-values for multiple testing following Benjamini and Hochberg (1995) at the one, five, and ten percent, respectively. ATEs are estimated using regression models controlling for gender, race/ethnicity, parents' education, current employment status, language spoken at home, high school GPA, ACT composite score, and family income. Standard errors (SE) are shown in parentheses.

Table 4. Effects of VISTA on credit attainment

outcome	control mean	ATE (SE)
year 1		
cumulative credits attempted	30.0	.8* (.4)
cumulative credits earned	25.3	.6 (.5)
earned 27+ credits in year 1 (%)	.589	.086***††† (.028)
year 2		
cumulative credits attempted	54.9	1.4 (1.1)
cumulative credits earned	45.5	1.6 (1.2)
earned 30+ credits in year 2 (%)	.353	.131***††† (.028)
year 3		
cumulative credits attempted	76.7	1.2 (1.9)
cumulative credits earned	63.7	1.5 (1.9)
earned 30+ credits in year 3 (%)	.361	-.010 (.028)
year 4		
cumulative credits attempted	96.3	.8 (2.7)
cumulative credits earned	80.2	1.4 (2.7)
earned 30+ credits in year 4 (%)	.306	.008 (.028)
year 5		
cumulative credits attempted	109.5	-.4 (3.3)
cumulative credits earned	91.2	.4 (3.2)
earned 30+ credits in year 5 (%)	.148	-.001 (.021)

Source: UNM Office of Institutional Research. Average treatment effects (ATE) are the covariate-adjusted difference between treatment and control groups. A two-tailed t-test was applied to differences between the research groups. ***, **, and * denote statistical significance at the one, five, and ten percent, respectively. †††, ††, and † denote statistical significance after adjusting *p*-values for multiple testing following Benjamini and Hochberg (1995) at the one, five, and ten percent, respectively. ATEs are estimated using regression models controlling for gender, race/ethnicity, parents' education, current employment status, language spoken at home, high school GPA, ACT composite score, and family income. Standard errors (SE) are shown in parentheses. Cumulative credits attempted and earned include those transferred from other institutions, the most common being from nearby community colleges.

Table 5. Effects of VISTA on degree attainment

outcome	control mean	ATE (SE)
earned degree by end of semester (%):		
7	.018	.002 (.008)
8	.125	.025 (.021)
9	.225	.054** (.025)
10	.332	.051* (.029)
11	.375	.042 (.030)
12	.432	.034 (.030)
13	.448	.036 (.030)
14	.470	.034 (.031)

Source: UNM Office of Institutional Research. Average treatment effects (ATE) are the covariate-adjusted difference between treatment and control groups. A two-tailed t-test was applied to differences between the research groups. ***, **, and * denote statistical significance at the one, five, and ten percent, respectively. †††, ††, and † denote statistical significance after adjusting *p*-values for multiple testing following Benjamini and Hochberg (1995) at the one, five, and ten percent, respectively. ATEs are estimated using regression models controlling for gender, race/ethnicity, parents' education, current employment status, language spoken at home, high school GPA, ACT composite score, and family income. Standard errors (SE) are shown in parentheses.

Table 6. Effects of VISTA on cumulative credits by income and GPA

characteristic	control mean	ATE	control mean	ATE
	HS GPA: Top 50%		HS GPA: Bottom 50%	
credits attempted				
year 1	31.4	0.0 (.6)	28.6	1.5** (.7)
year 2	60.2	-.2 (1.5)	49.6	3.3* (1.8)
year 3	86.4	-1.0 (2.6)	66.7	4.0 (2.9)
year 4	109.3	-1.3 (3.7)	82.6	4.0 (4.1)
year 5	123.9	-2.9 (4.5)	94.2	3.4 (5.1)
credits earned				
year 1	28.6	0.0 (.7)	21.8	1.5* (.9)
year 2	53.3	.3 (1.6)	37.3	3.7** (1.9)
year 3	76.0	-.1 (2.7)	50.8	4.2 (2.9)
year 4	96.0	.1 (3.7)	63.5	4.4 (4.0)
year 5	108.9	-1.5 (4.4)	72.5	4.0 (4.7)
earned degree by year 5	.468	.041 (.044)	.189	.064* (.037)
	Family Income: Top 50%		Family Income: Bottom 50%	
credits attempted				
year 1	30.7	-.1 (.7)	29.9	1.1* (.6)
year 2	56.7	-.5 (1.7)	54.6	2.2 (1.6)
year 3	79.3	-1.4 (2.8)	76.5	1.7 (2.8)
year 4	99.3	-2.0 (3.9)	96.2	1.4 (4.0)
year 5	112.8	-3.1 (4.9)	109.8	-.2 (5.0)
credits earned				
year 1	26.3	0.0 (.8)	25.1	.9 (.8)
year 2	47.7	-.1 (1.8)	44.9	2.5 (1.7)
year 3	67.2	-1.5 (2.8)	62.8	2.6 (2.8)
year 4	84.3	-2.1 (3.9)	79.4	2.7 (3.9)
year 5	95.8	-3.0 (4.7)	90.6	1.5 (4.7)
earned degree by year 5	.379	.07 (.042)	31.3	6.4 (4.1)

Source: UNM Office of Institutional Research. Average treatment effects (ATE) are the covariate-adjusted difference between treatment and control groups. A two-tailed t-test was applied to differences between the research groups. ***, **, and * denote statistical significance at the one, five, and ten percent, respectively. †††, ††, and † denote statistical significance after adjusting *p*-values for multiple testing following Benjamini and Hochberg

(1995) at the one, five, and ten percent, respectively. ATEs are estimated using regression models controlling for gender, race/ethnicity, parents' education, current employment status, language spoken at home, high school GPA, ACT composite score, and family income. Standard errors (SE) are shown in parentheses. Cumulative credits attempted and earned include those transferred from other institutions, the most common being from nearby community colleges. For the high school (HS) GPA analysis, the total sample size was 1,045, with 522 in the "HS GPA in Top 50%" subgroup, of which 257 belonged to the control group; there were 269 control group students in the "HS GPA in Bottom 50%" subgroup. For the family income analysis, the total sample size was 998, with 499 in the "Family Income in Top 50%" subgroup, of which 246 belonged to the control group; there were 253 control group students in the "Family Income in Bottom 50%" subgroup.

Table 7. Effects of VISTA on financial assistance during the first four years

outcome ($)	control mean	ATE
year 1		
total average financial assistance received	10,335	1,062***††† (252.9)
Pell Grant	3,828	-12 (91.9)
state lottery scholarship	2,209	19 (64.8)
VISTA scholarship	0	1,498***††† (28.0)
other grants	2,391	-83 (157.3)
loans	1,565	-329**† (144.4)
work-study	338	-32 (61.5)
year 2		
total average financial assistance received	8,235	861**†† (379.3)
Pell Grant	3,006	82 (149.2)
state lottery scholarship	2,197	116 (120.1)
VISTA scholarship	0	1,077***††† (36.7)
other grants	1,171	-85 (137.3)
loans	1,449	-265* (146.2)
work-study	406	-65 (74.2)
year 3		
total average financial assistance received	7,680	108 (412.6)
Pell Grant	2,546	-33 (152.0)
state lottery scholarship	2,051	56 (137.9)
VISTA scholarship	0	0 (0.0)
other grants	1,104	19 (147.5)
loans	1,651	112 (179.7)
work-study	327	-46 (67.7)
year 4		
total average financial assistance received	7,142	-129 (428.6)
Pell Grant	2,050	-68 (145.5)
state lottery scholarship	1,840	113 (143.0)
VISTA scholarship	0	0 (0.0)
other grants	970	67 (158.6)
loans	2,027	-211 (202.1)
work-study	255	-31 (61.0)

Source: UNM Office of Institutional Research. Rounding may cause slight discrepancies in sums and differences. Average treatment effects (ATE) are the covariate-adjusted difference between treatment and control groups. Two-tailed t-tests were applied to differences between the research groups. ***, **, and * denote statistical significance at

the one, five, and ten percent, respectively. †††, ††, and † denote statistical significance after adjusting *p*-values for multiple testing following Benjamini and Hochberg (1995) at the one, five, and ten percent, respectively. ATEs are estimated using regression controlling gender, race/ethnicity, parents' education, current employment status, language spoken at home, high school GPA, ACT composite score, and family income. Standard errors (SE) are shown in parentheses. State Lottery grant includes all Lottery Success scholarships and all Bridge to Success scholarships and grants. The VISTA scholarship was available only for program group students in the first and second year. Other grants include grants and scholarships such as the Presidential Scholarship, state incentive grants, and tribal scholarships. Loans category includes all subsidized and unsubsidized loans. Work study includes the amount the student received in the semester from both Federal and University work study.

Table 8. Differences in first semester college experiences

outcome	control mean	ATE
student engagement		
joined student organization or team	.399	-.071 (.055)
number of student activity types joined	.6	-.2*† (.1)
joined two or more student activity types	.165	-.079** (.039)
weekly study activities		
number of study activities with weekly participation	2.3	.2 (.2)
at least one study activity weekly	.856	-.011 (.041)
effort		
typical weekly hours studied	12.4	-.7 (1.1)
finals week hours studied	18.4	-1.6 (1.4)
missed no more than a few classes	.893	.029 (.034)
employment		
worked for pay	43.6	8.3 (5.7)
usual hours worked per week	9.4	3.3**† (1.5)
advising		
number of times saw adviser	3.1	1.7***††† (.4)
never saw adviser	.043	-.029*† (.017)
usual time spent with adviser (minutes)	18.5	-3.3**†† (1.4)
student reported topic somewhat or very important when meeting with advisor		
general academic requirements and college policies	.911	.027 (.031)
major/career counseling	.822	.064* (.039)
developing my academic plan for UNM	.894	.055* (.029)

Source: calculations from online survey of second cohort study participants conducted by University of New Mexico. Rounding may cause slight discrepancies in sums and differences. Average treatment effects (ATE) are the covariate-adjusted difference between treatment and control groups. Two-tailed t-tests were applied to differences between the research groups. ***, **, and * denote statistical significance at the one, five, and ten percent, respectively. †††, ††, and † denote statistical significance after adjusting *p*-values for multiple testing following Benjamini and Hochberg (1995) at the one, five, and ten percent, respectively. ATEs are estimated using regression models controlling for gender, race/ethnicity, parents' education, current employment status, language spoken at home, high school GPA, ACT composite score, and family income. Standard errors (SE) are shown in parentheses. "Missed no more than a few classes" includes students who selected either "I never missed a class" or "I missed just a few classes'" when asked to characterize attendance.

Table 8. Differences in first semester college experiences (continued)

outcome	control	ATE
<u>student agreed or strongly agreed with the following statements:</u>		
My adviser provided accurate and reliable information.	.817	.033 (.041)
My advisor helped me take on more responsibility for my academic career.	.570	.133**†† (.053)
My adviser was approachable.	.833	.057 (.038)
My adviser helped me find the answers to my questions.	.760	.113**†† (.045)
My adviser considered my personal qualities (abilities, interests, strengths, weaknesses, etc.) when helping me plan my academic program.	.564	.108**† (.054)
I am satisfied with the amount of time I spent meeting with my adviser during the past semester.	.689	.139***†† (.048)
My adviser helped me connect with other offices and resources on campus.	.547	.012 (.057)
Interactions (meetings, phone calls, emails, etc.) with my adviser were helpful.	.578	.201***††† (.053)
I was satisfied with my overall experience with my adviser.	.726	.120**†† (.047)
sample size (total = 388)	188	

Source: calculations from online survey of second cohort study participants conducted by University of New Mexico. Rounding may cause slight discrepancies in sums and differences. Average treatment effects (ATE) are the covariate-adjusted difference between treatment and control groups. Two-tailed t-tests were applied to differences between the research groups. ***, **, and * denote statistical significance at the one, five, and ten percent, respectively. †††, ††, and † denote statistical significance after adjusting *p*-values for multiple testing following Benjamini and Hochberg (1995) at the one, five, and ten percent, respectively. ATEs are estimated using regression models controlling for gender, race/ethnicity, parents' education, current employment status, language spoken at

home, high school GPA, ACT composite score, and family income. Standard errors (SE) are shown in parentheses.