THE IMPACT OF UNDERGRADUATE INTERNSHIPS ON Post-Graduate Outcomes for the Liberal Arts

By Eleanor Townsley, Liz Lierman, Jenny Watermill, and Dyanne Rousseau

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Research and analysis were conducted by a team at Mount Holyoke College that included:

LIZ LIERMAN, director of the Mount Holyoke College Career Development Center (CDC)
A dedicated advocate for the liberal arts, Lierman previously founded the first career services office for Bard College at Simon's Rock, and led career development programs for Oberlin College. She currently serves on the Principles for Professional Practice committee for NACE, and is an alumna of the NACE Leadership Advancement Program.

ELEANOR TOWNSLEY, professor of sociology and director of the Nexus Curriculum to Career Program
Townsley's recent research includes "Making the Lynk at Mount Holyoke: Institutionalizing Integrative Learning" published in Peer Review (2015), and "Science, expertise and profession in the post-normal discipline" in American Sociologist (2016). Her new work focuses on the humanities foundations of experiential learning.

JENNY WATERMILL, associate director for internships and student employment in the CDC
Watermill supervises experiential learning and has been a critical collaborator in the implementation of Mount Holyoke's Lynk Initiative, which connects academic work with practical applications of the liberal arts and sciences. She currently serves as the chair of the Employer Development Committee for the Liberal Arts Career Network.

DYANNE ROUSSEAU, CDC program manager
Rousseau is responsible for data systems and analytics related to student and alumnae advising, and manages the CDC's knowledge rate research project. She has a B.A. in politics from Mount Holyoke.

Abstract

High-quality internship experiences are increasingly understood to be an integral part of an excellent undergraduate education, yet questions remain regarding the impact of undergraduate internships on post-graduate outcomes. This study assesses student participation in different kinds of internships at a liberal arts college with a large-scale internship program. It investigates a range of student, institutional, and internship characteristics, including the source of funding and industry of internships.

Data on the Mount Holyoke College graduating classes of 2013, 2014, and 2015 were analyzed to investigate the relationship between participation in different kinds of internships and career outcomes six months after graduation, and to examine the relationship between internship participation and student development outcomes, such as academic performance and engagement in career development activities. The study also examines if the introduction of a universal internship-funding program has increased student access to internship opportunities.

The strongest predictors of initial career outcomes were grade point average and the total number of internships a student completed. There was no independent effect of the funding source of an internship on first destination. Internship participation was also associated with academic strength and international status. With the move from a competitive funding system to universal internship funding in 2014, student financial status and academic differences between students diminished greatly. These findings suggest that participation in multiple internships in college helps students to secure employment or enter graduate school within six months of graduation, and that the introduction of internship funding for every student increases access to internship opportunities. Findings related to academic performance, career center use, and the relationship between payment source and industry of internships also have implications for practice and future research.

Executive Summary

High-quality internship experiences are increasingly understood to be an integral part of an excellent undergraduate education. Prominent educational organizations advocate for internships as a pathway to career success for undergraduate students, and a body of research documents the positive relationship between college internship experiences and student preparation for career success. However, concerns about the conditions for unpaid interns and recent findings that paid internships, rather than unpaid internships, are associated with career success raise a variety of questions about the complex relationship between internships and post-graduate outcomes for students. In this context, the NACE Foundation issued a call for proposals in 2015 to further examine questions related to unpaid internships and career outcomes. (All research projects were subsequently transferred to the NACE Center for Career Development and Talent Acquisition.) Mount Holyoke College had implemented a new internship program the year before with the goal to increase access to internships. The new internship program provides a college-funded stipend for a summer internship or research experience for every student; connects internships with the liberal arts and sciences through a reflective curriculum; and facilitates career development through an application process that includes intentional advising, training, and pre-internship preparation. The scale of the Lynk internship program and Mount Holyoke's distinctive student population enable us to contribute to the growing research literature on internships in two ways: first, by disentangling questions about the association between participation in unpaid internships, college-funded internships, and employer-paid internships, and second, by allowing us to assess the impact of different kinds of internships on post-graduate outcomes.

Questions and Methods

Our research model assumes that post-graduate outcomes are produced at the complex social intersection between students' individual social and academic characteristics, students' career-seeking and internship behaviors, and the labor market opportunities students are able to access for internships during college and after graduation in employment and graduate school.

In framing the current study, we ask:

- Do internships improve post-graduate outcomes for students, net of the impact of racial, citizenship, and economic status; academic strength; and industry of internship?
- Do internships improve student outcomes such as grade point average (GPA), the likelihood of using the career center, or probabilities of doing more than one internship or a paid internship?
- Are more internships better? Do students who do two, three, or more internships have better post-graduate outcomes than students who do one internship or no internships?
- Is there a relationship between paid and unpaid internships?
- How important is reflective curriculum for internships?
- Does the source of the funds for an internship affect post-graduate outcomes?
- Does the existence of a universal internship-funding program improve access to internships for all students at a college, regardless of financial need?

We analyze the impact of internships on student educational and career outcomes in a series of linked regression analyses using data on the Mount Holyoke graduating classes of 2013, 2014, and 2015 (n=1818). Data were combined from multiple sources, including anonymized student records, internship reports, utilization data from the career development center, and surveys combined with a "knowledge rate" strategy to collect post-graduate outcomes information.

Multivariate regression is used to isolate the independent effects of student characteristics on the probability of completing different kinds of internships. This enables us to see the net effect of internships on post-graduate first destinations, and to assess the impact of several different kinds of internships, including employer-paid, unpaid, and college-funded internships. We can also distinguish the industry of internship, and we can compare internships before and after the implementation of a new college-wide internship-funding program in 2014.

Mount Holyoke's student population is distinctively diverse, which facilitates comparisons between student sub-groups that are sometimes difficult to study because of their smaller size in comparison to other samples of undergraduate students. International students, in particular, constitute a larger percentage of Mount Holyoke students relative to the national undergraduate student population. In addition, nearly 100 percent of Mount Holyoke students are women, creating a "natural control" for gender in this study.

Findings

To explore our research questions, we present three sets of regression analyses to model initial career outcomes, the total number of internships, and the source of funding of internships. We conclude with an investigation of whether or not the introduction of a universal internship-funding program has improved student access to internships.

Our major finding is that GPA and the total number of internships a student completed as an undergraduate student are the major predictors of initial career outcomes. Graduates with more internships and graduates with higher GPAs had higher odds of being employed relative to seeking employment six months after graduation. Graduates with stronger measures of academic strength and graduates with higher numbers of internships also had higher odds of being in graduate school relative to seeking employment at six months. Differences between those in employment and those in graduate school six months after graduation are more subtle, with citizenship status, academic major, financial need, and use of the career center distinguishing the two groups from one another.

Since the total number of internships a student completed as an undergraduate is a significant predictor of first destinations, our second analysis examines the factors associated with participation in at least one internship compared with no internships, and with participation in multiple internships compared with one internship. We found that:

- International student status is associated with higher odds of internship participation, a finding that does not appear in the existing research literature, likely because international students often form too small a percentage of an overall student population for clear comparisons. International students who were also frequent users of the career center had even higher odds of participating in one or more internships.
- Declaring a natural science major, having a high GPA, participating in reflection curriculum, and using the career center frequently were also associated with higher odds of internship participation.
- Traditionally aged, four-year students were more likely than transfer students and much more likely than non-traditionally aged students to participate in one or more internships.
- Being an international student or declaring a natural science major both increased the odds of participating in two or more internships compared with one internship.
- Although there were no significant racial differences between those who participated in a first internship rather than no internships, students who identify as Asian-American or Latina had higher relative odds of participating in multiple internships versus one internship.
- Being a transfer student or non-traditionally aged student decreased the odds of participating in two or more internships compared with one internship.
- For students with first internships that were employer paid or college funded, the odds of participating in a second internship were lower than if the first internship was unpaid.

- There was no significant effect of the industry of the first internship on the likelihood of a second internship.

Although the research literature suggests a positive impact of employer-paid internships on post-graduate career outcomes, we find no independent effect of internship payment source on career destinations at six months. Rather, the effect is to total number of internships completed as an undergraduate student. We therefore investigated how different types of internships contribute to internship participation and total number of internships. We found that:

- Students with at least one employer-paid internship were twice as likely as those with a college-funded internship to have two or more internships.

- Students with at least one unpaid internship were similar to those with employer-paid internships in that they were also twice as likely as those with college-funded internships to have two or more internships.

- Academic major and industry of internship are the best predictors of whether or not a student participated in employer-paid internships.

- Participation in unpaid internships is more common in humanities fields and, to some extent, social science fields; those less likely to participate in unpaid internships were students with higher GPAs, non-traditionally aged students, and frequent users of the career center.

- As students graduated in classes that had access to a universal college-funded internship program, there was a decline in the number of students who never completed an internship and an overall decline in the number of students participating in unpaid internships. Significant differences between the GPAs of students participating in internships disappeared, and there is now less of a difference between students of different financial standing in their likelihood of receiving internship funding.

Implications

Our study underscores the importance of increasing student access to internship experiences, as well as the central importance of academic strength, both in its impact on internships and independently, on post-graduate outcomes at six months. Universal internship funding at Mount Holyoke has increased access to a first internship for students and, by implication, to two or more internships. This raises the question of whether this might be an effective approach at other institutions as well. For institutions that have already improved access to first internships for their students, our findings raise further questions about which strategies may be most effective in building on this access to increase the total number of high-quality internships per student. Additionally, our findings make clear the need for outreach and programming specifically aimed at increasing use of the career center and supporting internship participation among transfer and non-traditionally aged students.

Although fewer and farther between than other types of internships, employer-paid internships have important value, as students with employer-paid internships were more likely to complete two or more internships in total. Further research on employer-paid internships is warranted. Issues include gender differences in paid internship participation, the interaction between the availability and impact of paid internships in particular industries, and employers' use of paid internships as a recruiting strategy. Knowing answers to these questions would increase our understanding of who can access employer-paid internships, and to what extent the importance of internship payment source varies according to the industry.

As we strive to maximize career success and post-graduate outcomes for all our students, we know that we need to support students to succeed academically. There is also evidence that internship participation (especially participation in multiple internships over the course of a college career), engagement in career development activities, and an accurate understanding of labor market realities are central to a student's ability to respond to post-graduate opportunities and challenges.

Introduction

High-quality internship experiences are increasingly understood to be an integral part of an excellent undergraduate education, with prominent educational organizations advocating internships as a pathway to career success for undergraduate students.[1] Both the Council for the Advancement for Standards in Higher Education[2] and the National Association of Colleges and Employers (NACE) have focused on the conditions of internships for undergraduate students, raising questions about the educational value of internships, and especially unpaid internships, in the context of labor law.[3] Our current project emerges in this context as an effort to assess the impact of experiential learning on career outcomes in response to NACE's request for research proposals.[4] In what follows, we explore the relationship between internship participation and educational and career outcomes using the case study of a small New England liberal arts college with a large-scale internship program.

Previous research

The number of internships completed by U.S. college students has increased in the last 20 years, and the uncertain and competitive job market that emerged in the wake of the 2008 world financial crisis refocused public attention on the role of internships in undergraduate education as a way to prepare for career success.[5] Research about the impact of internship experiences on educational and career outcomes within the first six months of graduation, however, is equivocal. While completing a paid internship is positively correlated with receiving a full-time job offer prior to college graduation,[6] evidence of the impact of unpaid internships on post-graduate outcomes is less clear cut.

Gardner's[7] research for *Intern Bridge,* for example, indicated that unpaid internships carried educational benefits, but the immediate career dividend was less apparent. Gardner's work also showed that women were significantly more likely than men to be engaged in unpaid internships, and liberal arts majors in the social science and humanities fields were more likely to engage in unpaid internships than those in engineering, computer science, business, and communications. More recent research by Crain[8] confirms these general findings. Crain analyzes student survey data from a large public southeastern university to show that, while unpaid internships have a positive impact on students' academic experiences and career-seeking behaviors in college, there is no evidence of a direct impact of unpaid internships on post-graduate career outcomes. Since unpaid internships are more likely to be found among female, liberal arts, education, and health students,[9] this difference in internship experience interacts with gender and field of academic major to produce inequality in post-graduate outcomes by field of study.

Access and excellence

As a liberal arts college for women, Mount Holyoke College has watched the national conversation about internships closely. Starting in 2012, we began a series of conversations about what kinds of internships matter for career success among liberal arts graduates. As we assessed our own student data, we were struck both by the economic obstacles and the lack of information that prevented many students from pursuing internships. Together, as a community of faculty, students, staff, and trustees, we sought an approach to internships that would embed high-quality, educationally substantive internships within the deep intellectual experience provided by our traditional liberal arts curriculum.

The result of these conversations was the introduction of a centralized, clearly communicated universal internship-funding program, which we named the Lynk.[10] Since 2014, the Lynk internship program has guaranteed a flat rate stipend of $3,000 for domestic internships and $3,600 for international internships to every student at least once during her undergraduate career. The program was designed intentionally to ensure access to high-quality, substantial summer internships for all students, regardless of financial background. In addition to flat stipends, Lynk provides additional grant support to offset the summer earnings burden for students with very high financial need, and it includes additional stipends for internships in expensive world cities or internships that involve international travel costs.

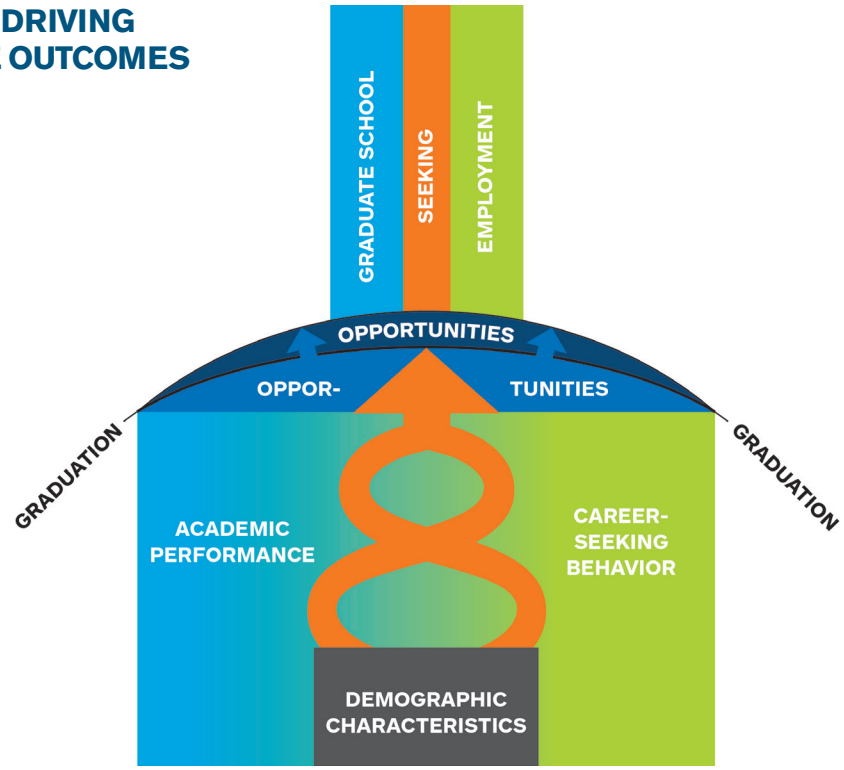
The Lynk program also aims to deliberately connect internships to liberal arts courses, and our application and accounting system for Lynk internships mandates that students complete a reflective curriculum as part of their internship experiences. This includes one-on-one internship advising; online modules on goal setting, financial management, human subjects protections, and employment discrimination; and credit-bearing reflection and public speaking requirements. This element of the internship program draws from the literature on reflection and capstone courses that

suggests the value of learning in an internship can be better leveraged if students are well prepared for internships and also if they reflect on their learning when they return to campus following an internship.[11] It is also in line with the concern expressed both by the Department of Labor[12] and NACE[13] that internships should provide an educational benefit to students.

Model and assumptions

Our research model assumes that post-graduate outcomes are produced at the complex social intersection between students' individual social and academic characteristics, students' career-seeking and internship behaviors, and the opportunities students are able to access for internships during college and, following graduation, the opportunities they are able to access in employment and higher education.

INTERSECTIONS DRIVING POST-GRADUATE OUTCOMES



The development of our new internship program has created a natural laboratory to study the relative impact of these different factors on post-graduate outcomes. We compare paid and unpaid internships across industries, and consider the effects of guaranteeing an internship to students versus asking students to compete for funding, and we also compare the impact of different kinds of paid internships on student outcomes. The following research questions focus on the impact of internships, both in sharpening educational and career choices, and supporting post-graduate career success.

Do internships improve post-graduate outcomes for students, net of the impact of racial, citizenship, and economic status; academic strength; and industry of internship? Our working assumption is that internships improve educational and career outcomes for every student, regardless of social and academic characteristics.

H1 Participation in at least one summer internship improves post-graduate outcomes for participating students, with "improved post-graduate outcomes" defined as a greater likelihood of securing full-time employment or graduate school enrollment within six months of graduation.

Do internships improve student outcomes, such as GPA, the likelihood of using the career center, or the probability of doing more than one internship or a paid internship? Following previous research, we assume that internships are associated with measures of academic strength and higher use of available career services.

H2 Participation in at least one summer internship increases access to student opportunities for participating students, with "increased access to student opportunities" defined as a greater likelihood of using the career development center, greater likelihood of securing a second summer internship, increased likelihood of securing a paid internship, or increased likelihood of attaining a higher GPA.

Are more internships better? Do students who do two, three, or more internships have better post-graduate outcomes than students who do one internship or no internships? Is there a relationship between paid and unpaid internships? Our model assumes that students who complete more internships are more likely to have improved post-graduate and educational outcomes.

H3 Students who complete two or more internships are more likely than those with one internship to participate in student opportunities defined as a greater likelihood of using the career center, securing a third summer internship, securing a paid internship, or attaining a higher GPA.

How important is reflective curricular scaffolding for internships? Drawing on the literature on reflective curriculum, we also assume that on-campus reflection following an internship positively contributes to educational and career outcomes.

H4 Students who participate in facilitated, on-campus reflection after a summer internship will have increased access to student opportunities and improved post-graduate outcomes.

Focusing on paid internships, we examine whether or not the source of the funds for an internship affects the outcomes of an internship. Previous research supported by NACE indicates that paid internships are correlated with the likelihood of receiving a full-time job offer only for students who had interned for the same employer that later extended an offer.[14] In these cases, employer-funded internship programs appear to serve as recruitment tools and this is what accounts for the higher frequency of job offers for students in those internship programs. In the context of our college-funded internship program for all students, we want to know if paid internships have an effect on student outcomes, regardless of the source of the funds supporting the internship.

H5 Students who receive funding for their internships from any source (employer or college stipend) will be more likely to secure full-time employment or graduate school enrollment within six months of graduation than students with no internships, and students who received no funding for their internships.

Providing internship funding for all students is premised on a commitment to access to internship opportunities for all students. In the new Lynk internship program, funding accrues to qualified internships rather than to qualified students. A central question for Mount Holyoke is if the existence of a universal internship program improves access to internships for all students, regardless of financial need or other characteristics.

H6 Following the implementation of the Lynk internship program in 2014, we expect to find a reduction in the influence of demographic differences (economic, racial, citizenship status) and academic differences (academic major, double major, GPA) between students who pursued internships and those who did not.

In what follows, we describe our data and methods, and present our analysis of internships that assesses the relative weight of individual, college level, and labor market factors on post-graduate student outcomes. We conclude with a brief discussion of our findings and suggestions for future research.

Data and Methods

We analyze the impact of internships on student educational and career outcomes in a series of linked regression analyses using data on the Mount Holyoke graduating classes of 2013, 2014, and 2015 (n=1818). Multivariate regression is a technique used to isolate the independent effects of student characteristics on the probability of completing different kinds of internships, and it also enables us to tease out the net effect of internships on first destinations following graduation. This is useful since causal arguments about the impact of internships on student outcomes are notoriously difficult to disentangle. Predictors of internship uptake, academic success, and first destinations are highly correlated, and there are well-known selection effects in student samples used to study internships and career outcomes, with "successful" students as indicated by higher GPA or higher participation in internships more likely to report outcomes compared to less successful students. By collecting full population samples for the three classes we study, our goal is to minimize the impact of response bias on our findings, although it's important to note that first destination data is still subject to non-response of nearly 40 percent. (See Appendix 1.)

Data were combined from multiple sources to connect student characteristics, academic characteristics, career-oriented behavior, summer internship characteristics—including funding source, industry, and number of internships—and first destination data. (For details of data collection, see Appendix 2.)

Sources include:

- Anonymized student records;
- Internship reports from the registration system;
- Internship reports from the internship application system;
- Utilization data from the career development center;
- Annual institutional surveys, including the *Senior Survey* and the *Six Months Out Survey;* and
- A knowledge rate strategy[15] to collect outcomes information for graduates who we did not capture using standard institutional tools.

Table 1 lists dependent and independent variables, and it reveals that Mount Holyoke's student population is distinctively diverse. One quarter of the student body are foreign citizens, and 28 percent of all students identify as African American, Asian American, Latina, Native American, or Multiracial. Only 47.4 percent of students identified themselves as White. Students hail from 48 states and more than 70 countries. This is a very different picture than the national undergraduate student population, which is much more domestic and white. The National Center for Educational Statistics reports that international students constituted only 3.1 percent of those receiving baccalaureate degrees in the United States between 2013 and 2015, while white students were more heavily represented: 67.3 percent of all U.S. students receiving baccalaureate degrees during this period were white. The distinctiveness of Mount Holyoke's student body is an advantage because it enables us to drill down and make comparisons between student sub-groups that are sometimes difficult to study because of their small sizes.

Importantly, nearly 100 percent of Mount Holyoke students are women, with the exception of a small number of students who express a more gender-fluid identity. This creates a "natural control" for gender in our study. Mount Holyoke also includes a small population (6.2 percent) of Frances Perkins students who are non-traditionally aged.

Students at Mount Holyoke also come from economically diverse backgrounds. About 20 percent receive financial aid for the full cost of their college tuition, room, and board, while at the other end of the distribution, 26.8 percent of students come from family backgrounds with no financial need. Our data are based on financial need categories and are not strictly comparable with the household income distribution reported for the large national sample of students in Gardner's[16] study of students from a wide range of institutions. Nonetheless, a rough comparison shows that the economic backgrounds of Mount Holyoke students are somewhat higher income, but otherwise similar in economic spread to those Gardner documented.

TABLE 1 Frequencies

FIRST DESTINATION

First Destination	n=1071
Employed	75.3%
Continuing education/grad school	21.5%
Seeking employment/volunteering/travel	3.3%

Numbers do not sum to 100% because of rounding error

DEMOGRAPHIC CHARACTERISTICS

Race (Including International)	n=1818
Native American	0.1%
Asian	6.6%
Black	5.6%
Latinx	8.5%
Multiracial	3.4%
White	47.4%
International (all)[a]	24.6%
Unknown	3.9%
Financial Need	**n=1818**
No need	26.8%
Low need	40.3%
Moderate need	15.2%
Highest need	17.8%
Student Type	**n=1818**
First year	87.1%
Transfer	6.8%
Frances Perkins	6.2%
Year of Graduation	**n=1818**
2013	33.7%
2014	31.8%
2015	34.5%

[a]*Citizenship and race categories have been combined into one variable, since 90 percent of international students identify as students of color.*

ACADEMIC CHARACTERISTICS

GPA[b]	n=1818
Low GPA	22.2%
Medium GPA	48.4%
High GPA	29.4%
Academic Major	**n=1818**
Natural science	19.7%
Social science	39.1%
Humanities	26.1%
Cross-division major/interdisciplinary major	15.1%
Double Major	**n=1818**
Double major	19.3%

[b]*High GPA is measured as 3.75 and above. Low GPA is less than 3.25 and Medium GPA is 3.25-3.75. While perfect 4.0s and the award of summa cum laude is rare, many students do achieve high GPAs.*

CAREER BEHAVIOR

Preparation Curriculum	n=1818
Preparation Curriculum	22.7%
Reflection Curriculum	**n=1818**
Reflection Curriculum	24.5%
Career Center Usage Over UG Career	**n=1818**
Never	16.1%
1 to 3 CDC visits	32.9%
4 or more CDC visits	51%
Career Center Usage Pre-First Internship	**n=1424**
No CDC visit pre-opportunity	34.0%
Went once to CDC pre-opportunity	20.8%
Went more than once to CDC pre-opportunity	45.2%

INTERNSHIPS

Total # Summer Internships	n=1818
0	21.7%
1	32.2%
2	30.7%
3 or more	15.4%

TABLE 1 Frequencies *cont.*

INTERNSHIP PAYMENT SOURCE

# Employer-Paid Internships in UG Career	n=1423
0 Employer-paid internships	75.2%
1 Employer-paid internship	17.1%
2 Employer-paid internships	6.0%
3 Employer-paid internships	1.8%
# MHC-Paid Internships in UG Career	**n=1423**
0 MHC internships	70.1%
1 MHC internship	24.6%
2 MHC internships	4.4%
3 MHC internships	0.8%
4 MHC internships	0.1%
# Unpaid Internships in UG Career	**n=1423**
0 Unpaid internships	58.7%
1 Unpaid internship	31.8%
2 Unpaid internships	8.1%
3 Unpaid internships	1.3%
4 Unpaid internships	0.1%

INTERNSHIP INDUSTRY

Profit Sector Internships in UG Career	n=1423
0 profit sector internships	78.6%
1 profit sector internship	15.4%
2 profit sector internships	4.7%
3 profit sector internships	1.2%
4 profit sector internships	0.1%
Government Internships in UG Career	**n=1423**
0 government internships	85.0%
1 government internship	12.0%
2 government internships	3.0%
Non-Profit Internships in UG Career	**n=1423**
0 non-profit sector internships	46.1%
1 non-profit sector internship	34.8%
2 non-profit sector internships	15.0%
3 non-profit sector internships	4.0%
4 non-profit sector internships	0.1%

Table 1 also lists variables measuring academic strength: GPA, division of academic major (for a description of the coding of academic major, see Appendix 3), if a student declared a double major, and if a second major is in a different division than the first (for example, if the second major is in the humanities and the first in the natural sciences). Double majoring, which is optional, and majoring across divisions are typically choices made by strong students with high GPAs. Measures of career-oriented behavior include participating in preparatory and reflective curriculum connected to internships and career center usage prior to a first internship and throughout the full undergraduate college career.

For internships themselves, we count the total number of summer internships, distinguishing between employer-paid internships, college-paid internships, and unpaid internships. We also distinguish between internships in the for-profit, government, and non-profit sectors. We observe that about one quarter of all students do reflective curriculum associated with their internships. Tracking previous research, we find that internships taken up by students at our small private college are more likely to be in the non-profit sector (53.9 percent) than in the for-profit (21.4 percent) or government (15 percent) sectors. And while more than three quarters of all students participated in at least one internship (78.3 percent) and nearly half participated in two or more internships (46.1 percent), only 24.8 percent of all internships were employer paid. This compares with 41.3 percent of all internships that were unpaid. An additional 29.9 percent of all internships were supported by a college-funded Lynk internship stipend. The total number of internships during an undergraduate career and the payment status of internships are dependent variables in the analyses that follow.

The first destination of students six months after college graduation is the third dependent variable in this analysis. We followed NACE coding guidelines[17] to construct the variable, which shows that 96.7 percent of all graduates were either employed or in graduate education programs six months after graduation. Our sense is this overestimates employment and graduate school, since response bias on surveys of initial career outcomes six months after graduation is positively skewed. (See Appendix 1.)

To explore our hypotheses, we present three sets of logistic regression analyses to model initial career outcomes, the total number of internships, and the source of internship funding. Logistic regression is a generalization of ordinary linear regression for analyzing binary dependent variables that can be coded 0/1; for example, sick/healthy, pass/fail. In the current research, our binary outcome is employed/seeking employment. Logistic regression is different than linear regression because the underlying shape of the distribution it uses to model the data is different.

Linear regression fits a line to the data, and linear regression coefficients have a straightforward interpretation as the amount of change in the dependent variable for a one-unit change in the independent variable. The relationship between the independent and dependent variables is assumed to be linear. Logistic regression, by contrast, calculates the odds of being in one category, relative to the odds of being in the other. The underlying distribution is S-shaped. Coefficients are the log odds of being in one category relative to another, and are less straightforward to interpret than linear regression coefficients.

In logistic regression, odds ratios are used to assess the relative chances of falling into one category rather than another. An odds ratio "is the factor by which the odds of being in the predicted level of the binary dependent variable multiplies when the independent variable increases one unit."[18] With a categorical independent variable, the interpretation of odds ratios is fairly intuitive, since multiplying by the odds ratio defines a specific value of y for a specific category of x. (For a good explanation of interpreting coefficients in logistic regression, see Garson 2016.)

At the end of the report, we turn to the issue of whether or not the introduction of a universal internship-funding program has improved access to internships for all students.

Findings

Initial career outcomes

The outcome variable for career outcomes at six months after college graduation is coded following NACE protocols.[19] It distinguishes those graduates who were employed (75.3 percent), from those in graduate school (21.5 percent) and those still seeking employment (3.3 percent).

Table 2a reports the results of a logistic regression modeling the odds of being employed relative to the odds of seeking employment six months after graduation. It shows that GPA and the total number of internships a student participated in during her undergraduate career are the major predictors of initial career outcomes. Those graduates who had two or more internships while in college were twice as likely to be employed at six months rather than to be seeking employment, relative to those who never participated in an internship. Graduates who had one internship also had higher odds of being employed than to be seeking employment compared to those with no internships (although note that this coefficient does not approach statistical significance). Graduates with higher GPAs had much higher odds of being employed than those with lower GPAs.

TABLE 2a

RELATIVE ODDS OF EMPLOYED VS. SEEKING (n=841)

	B	S.E.	Odds Ratios
Total Number of Internships			
1 internship	.598	.431	1.819
2 or more internships	.877**	.433	2.403
(base = No internship)			
Grade Point Average			
Medium GPA	.473	.374	1.605
High GPA	2.220***	.769	9.206
(base = Low GPA)			
Constant	1.988***	.340	7.303
Excluded category=Seeking			

-2LL	*270.892*
X^2	*20.178, df=4, 0<.001*
Nagelkerke R^2	*8%*
Classification accuracy	*95.8%*

An exploratory analysis of competing alternative models examined many other possible predictors of employment, including industrial sector and source of funding of internships, race, citizenship, and financial need. None of these factors significantly affected the odds of being employed versus the odds of seeking employment six months after graduation. That said, an expanded model that investigated all possible interaction effects did marginally improve the model's explanatory power. It showed that the effect of the total number of internships on first destination six months after graduation depends on frequency of visits to the career center, although the main effect of career center usage is not significant (analysis not reported here). This means that the impact of career center visits on initial career outcomes is fully expressed through its impact on total number of internships. In short, the relative odds of being employed versus seeking employment is jointly produced by GPA on the one hand, and the interaction of career center usage and number of internships on the other. GPA remains, by far, the strongest predictor in the model.

TABLE 2b

RELATIVE ODDS OF GRAD SCHOOL VS. SEEKING (n=265)

	B	S.E.	Odds Ratios
Total Number of Internships			
1 internship	.566	.518	1.761
2 or more internships	1.016**	.496	2.762
(base = No internship)			
Grade Point Average			
Medium GPA	1.134***	.446	3.108
High GPA	3.313***	.816	27.467
(base = Low GPA)			
Second Major			
Second major	-1.132	.553	.322
(base = One major)			
Cross-Divisional Major			
Cross-divisional major	1.536	.923	4.645
(base = Majors in same division)			
Constant	.082***	.427	1.086
Excluded category = Seeking			

-2LL	*166.204*
X^2	*40.662, df=6, 0<.001*
Nagelkerke R^2	*26.3%*
Classification accuracy	*87.2%*

Table 2b reports the odds of being in graduate school six months after graduation versus seeking employment. The results are similar to those documented for employment in Table 2a. Unsurprisingly, measures of academic strength are the most strongly associated with the relative odds of being in graduate school at six months compared to the odds of seeking employment. Those in graduate school had higher GPAs, and were more likely to have declared a double major or a second major in a different academic division rather than two humanities majors or two science majors. A higher number of internships during an undergraduate career was also associated with higher relative odds of being in graduate school compared to job seeking at six months. There are no statistically significant interactions with the main effects in this model.

Table 2c reports the odds of being employed six months after graduation relative to the odds of being in graduate school. This model excludes the small number of graduates still seeking employment.

TABLE 2c

RELATIVE ODDS OF GRAD SCHOOL VS. EMPLOYMENT (n=1036)

	B	S.E.	Odds Ratios
Citizenship			
Foreign	.674***	.192	1.962
(base = Domestic)			
Race			
Asian American	.613**	.310	1.845
(base = non-Asian American)			
Financial Need			
Low need	-.184	.184	.832
Moderate need	-.336	.259	.715
High need	-.648***	.270	.523
(base = No need)			
Grade Point Average			
Medium GPA	.666***	.256	1.946
High GPA	1.067***	.263	2.906
(base = No need)			
Academic Major			
Social science	-.479***	.204	.619
Humanities	-.363	.222	.696
Interdisciplinary	-.355	.244	.701
(base = Natural science)			
Frequency of Career Center Use			
1 to 3 career center visits	-.305	.239	.737
4 or more career center visits	-.569	.232	.566
(base = No career center visits)			
Constant	-1.243***	.326	.289
Excluded category = Employment			

-2LL	*1047.862*
X^2	*49.132, df=12, 0<.001*
Nagelkerke R^2	*7.1%*
Classification accuracy	*78.1%*

Again, GPA has the strongest influence in the model. This is followed by citizenship, with international students far more likely to be in graduate school than domestic students. Of all the race dummy variables in the model, the only significant predictor of the odds of attending graduate school relative to entering employment six months after graduation is identifying as Asian American. Identifying as Asian American is associated with an 80 percent increase in the odds of attending graduate school relative to entering employment.

The difference between those in graduate school and those in employment is also associated with a range of other characteristics, including academic major (natural science majors had higher odds of being in graduate school) and financial need (those with higher need were more likely to be employed than in graduate school). Being a frequent user of the career center was associated with being in employment rather than graduate school. There is no difference in internship participation between graduates who entered employment and those who entered graduate school.

In summary, the major predictors of being employed or in graduate school on the one hand compared to seeking employment on the other are GPA and total number of internships in a college career. The difference between those in employment and those in graduate school are more fine-grained. Citizenship status, academic major, financial need, and use of the career center distinguish between those who are employed and those in graduate school six months after graduation.

Internships

Since the total number of internships in a college career is a significant predictor of first destinations, the second part of our analysis investigates the social, academic, and behavioral factors associated with internship participation. Logistic regression is used first to model the odds of participating in one or more internships versus no internships, and second to model the difference between one internship relative to multiple internships.

The analysis reported in Table 3a shows that being an international student, declaring a natural science major, having a high grade point average, participating in reflection curriculum, and being a frequent user of the career center are all associated with higher odds of internship participation. Student type is also significantly associated with internship participation, with traditional four-year students being more likely than transfer students and much more likely than Frances Perkins scholars to participate in one or more internships.

The finding that citizenship status is associated with the odds of first internship participation is novel. It does not appear in the existing research literature, most likely because international students are too small a fraction of the overall population to discern clear effects. Given our much more substantial population, we can show that being an international student is strongly associated with participating in internships and the effect works through an interaction with career center use; that is, international students who are also frequent users of the career center have even higher odds of participating in one or more internships.

The second half of our internships analysis uses logistic regression to model the odds of participating in multiple internships—two or more internships—relative to the odds of participating in only one internship. This model, presented in Table 3b, excludes students who report never participating in an internship and enables us to focus on differences between those students who find multiple internships and those who do just one. This model also considers the characteristics of a student's first internship—the industrial sector of the first internship and source of payment for the first internship—to investigate if these characteristics affect the odds of participating in a second internship.

TABLE 3a

ODDS OF INTERNSHIP VS. NO INTERNSHIP (n=1818)

	B	S.E.	Odds Ratios
Student Type			
Transfer	-.337	.284	.714
Frances Perkins	-.768***	.236	.464
(base = Traditional 4 year)			
Citizenship			
Foreign	.298	.436	1.347
(base = Domestic)			
Academic Major			
Social science	-.480***	.199	.619
Humanities	-1.048***	.198	.351
Interdisciplinary	-.555***	.243	.574
(base = Natural science)			
Grade Point Average			
Medium GPA	.502***	.153	1.652
High GPA	.641***	.180	1.899
(base = No need)			
Frequency of Career Center Use			
1 to 3 career center visits	.649***	.172	1.914
4 or more career center visits	1.248***	.180	3.484
(base = No career center visits)			
Reflection Curriculum			
Participated in reflection	2.908***	.391	18.318
(base = No reflection)			
Interaction Citizenship * Student Type			
Foreign* Transfer	.147	.701	1.159
Foreign* Frances Perkins	-3.276***	1.064	.038
(base = Foreign Traditional)*			
Interaction Citizenship * Frequency of Career Center Use			
Foreign*1 to 3 career center visits	.391	.536	1.479
Foreign*4 or more career center visits	1.494***	.581	4.455
(base = Foreign No career center visits)*			
Constant	.309	.223	1.362
Excluded category = Employment			

-2LL	*1480.620*
X^2	*422.583, df=15, 0<.001*
Nagelkerke R^2	*32%*
Classification accuracy	*80.5%*

Results of the analysis of multiple internships, presented in Table 3b, are similar to those found in the model predicting first internship. Being an international student and declaring a natural science major both significantly improve the odds of participating in two or more internships versus one internship only. Having a higher GPA and doing reflection curriculum also improve the odds of participating in multiple internships compared to only one.

In addition to citizenship status, students who identify as Asian American or Latina also had a higher likelihood of participating in two or more internships rather than just one internship, compared to non-Asian American students or non-Latina students. Recall that there were no significant racial differences identified in the model of first internship versus no internship. Once again, we find that compared to being a traditional four-year student, being a transfer student or a Frances Perkins student decreases the odds of participating in two or more internships compared to one internship.

These findings suggest that the college needs to engage in more outreach and programming aimed at transfer students and Frances Perkins scholars to ameliorate the internship gap with traditional students. This is especially important since Table 3b shows again that being a frequent user of the career center not only improves the odds of a second internship compared to just one, but that this effect is more pronounced for a second internship than the first internship. In fact, in further analysis not shown here, student type is found to interact with using the career center. That is, if transfer students and Frances Perkins students use the career center, their odds of second internships are greatly increased.

Surprisingly, Table 3b also shows that if the first internship was employer paid, a student had lower odds of participating in a second internship relative to the odds of a student whose first internship was unpaid. While there was no significant effect of the industry of first internship on the odds of a second internship, it seems clear that payment source matters. A possible explanation for this is the lower availability of competitive paid internships, and the real possibility that paid internships are more common in male-typed fields or are differentially awarded to male candidates rather than female candidates. Higher rates of paid internships among male students, which were reported in both Gardner's[20] and Crain's[21] research, are suggestive in this connection.

TABLE 3b

ODDS OF TWO OR MORE INTERNSHIPS VS. ONE INTERNSHIP (n=1423)

	B	S.E.	Odds Ratios
Race			
Asian American	.628***	.267	1.874
(base = non-Asian American)			
Latinx American	.508***	.234	1.662
(base = non-Latinx)			
Citizenship			
Foreign	.958***	.160	2.606
(base = Domestic)			
Student Type			
Transfer	-1.099***	.260	.333
Frances Perkins	-.671**	.327	.511
(base = Traditional 4 year)			
Frequency of Pre-Internship Career Center Use			
1 pre-internship career center visit	-.581***	.199	.560
2 or more pre-internship career center visits	-1.222***	.192	.295
(base = No pre-internship career center visits)			

TABLE 3b *cont.*

ODDS OF TWO OR MORE INTERNSHIPS VS. ONE INTERNSHIP (n=1423)

	B	S.E.	Odds Ratios
Frequency of Career Center Use			
1 to 3 career center visits	.449*	.237	1.566
4 or more career center visits	1.062***	.255	2.892
(base = No career center visits)			
Reflection Curriculum			
Participated in reflection	.708***	.148	2.030
(base = No reflection)			
Academic Major			
Social Science	-.627***	.176	.534
Humanities	-.999***	.199	.368
Interdisciplinary	-.459***	.213	.632
(base = Natural science)			
Grade Point Average			
Medium GPA	.258	.167	1.295
High GPA	.716***	.189	2.046
(base = Low GPA)			
Funding of First Internships			
Employer paid	-1.686***	.162	.185
College funded	-.327**	.160	.721
(base = Unpaid)			
Constant	.688	.266	1.989
Excluded category = Employment			

-2LL	*1501.243*
X^2	*352.152, df=17, 0<.001*
Nagelkerke R^2	*30.6%*
Classification accuracy	*72.3%*

Internship funding

The research literature indicates that paid internships have a positive impact on initial career outcomes six months after graduation, whereas our analysis finds no independent effect of payment source on initial career outcomes. Rather, we show that simply having more internships is associated with higher relative odds of being employed or in graduate school six months after graduation compared to still seeking employment. In the third section of our analysis, we therefore investigate how different kinds of internships contribute to total numbers of internships. We also ask if employer-paid internships are similar to or different from internships that the college funds under its universal internship program. Or are college-funded internships more akin to unpaid internships?

Employer-paid internships were the rarest kind of internships. Only 24.8 percent of internships were employer paid, while 29.9 percent were college funded and 41.3 percent were unpaid. At the same time, students with the highest number of internships were more likely to have employer-paid internships or unpaid internships rather than college-funded internships.

Looking closely at the relationship between the funding source of internships and the total number of internships in an undergraduate career, Table 4 shows that 38.9 percent of students had second internships. (Note that this proportion is lower than in the full sample where it is 46.1 percent because of missing data on the internships-funding measure.) Looking across columns that indicate the funding source of internships, note that among employer-paid internships, a much higher proportion of second internships were employer paid than the average, and a much higher proportion of third internships were employer paid than the average for third internships overall. Forty-five percent of all employer-paid internships were second internships compared to only 38.9 percent of second internships in the population at large, while 22.3 percent of employer-paid internships were third internships, compared to only 18.4 percent of third internships in the population at large. This finding lends weight to earlier research about the value of employer-paid internships.

At the same time, we find that unpaid internships, like employer-paid internships, are associated with a higher number of internships over a college career. Looking at the column for unpaid internships, a much higher proportion of second and third internships were unpaid internships than average for the population at large (46.1 percent compared to 38.9 percent, and 24.5 percent compared to 18.4 percent). This finding has extra weight since unpaid internships are the most common kind of internships available to undergraduate students.

In stark contrast to the pattern for employer-paid and unpaid internships are college-funded internships, which are predominantly first internships. Among those students who completed college-funded internships, two thirds completed only one internship. In contrast, employer-paid internships and unpaid internships were far less likely than average to be first internships (32.6 percent and 29.4 percent, respectively, compared to 41.4 percent on average). This suggests that college-funded internships are being completed by students who may not otherwise complete an internship.

Contextualizing these findings within the preceding multivariate analyses is also important to get a full picture of the impact of funding source on the number of internships a student completes as an undergraduate. While Table 4 shows that employer-paid and unpaid internships are associated with a higher total number of internships for individual students, looking back at Table 3b reminds us that when we control for the independent effects of other variables like citizenship, race, student type, academic strength, and frequency of using career services, employer-paid internships are far less likely than unpaid internships to increase the odds of a second internship compared to doing just one internship. Rather, unpaid internships, which are much more widely available, are more likely to increase the relative odds of

TABLE 4

PERCENTAGE OF INTERNSHIPS BY FUNDING SOURCE

	Employer Paid	Unpaid	College-Funded	Total
1 internship	32.6%	29.4%	65.4%	41.4%
2 internships	45.0%	46.1%	23.8%	38.9%
3+ internships	22.3%	24.5%	10.8%	18.4%
	100%	100%	100%	100%
	(323)	(588)	(425)	(1366)

participating in multiple internships while in college.

Since more than 40 percent of all Mount Holyoke students participate in two or more internships during their undergraduate careers, we also report findings from three separate models of the odds of participating in employer-paid internships, college-funded internships, and unpaid internships.

Employer-paid internships

Looking first at employer-paid internships, which are 24.8 percent of all internships in our sample, we find that academic major and industry of internship are the best predictors of whether or not a student participated in employer-paid internships.

Figure 2 shows that natural science majors are over-represented among those completing employer-paid internships (30.5 percent compared to 24.8 percent on average). Humanities majors, in contrast, were significantly less likely to complete employer-paid internships (16.9 percent compared to 24.8 percent on average).

Beyond the academic major, the strongest predictor of participating in employer-paid internships was the industry of internship. Figure 3 shows that among those completing one internship in the for-profit sector, 27.9 percent had employer-paid internships. Among students with one internship in the government sector, 18.7 percent had employer-paid internships. In the nonprofit sector, among those who did one internship, only 14.1 percent completed an employer-paid internship. This pattern is more marked among those participating in two or more internships. Among those students who did two or more internships in the for-profit sector, 21.2 percent did employer-paid internships. Among those students completing two or more internships in government, 25.6 percent were employer-paid internships. In contrast, for those completing two or more internships in the non-profit sector, only 9.1 percent were employer-paid internships. In short, the likelihood of having an employer-paid internship varies by industry of internship. This confirms the common understanding that there are generally greater resources in many businesses and government departments than in

FIGURE 2 ONE OR MORE EMPLOYER-PAID INTERNSHIPS, BY DISCIPLINE OF ACADEMIC MAJOR

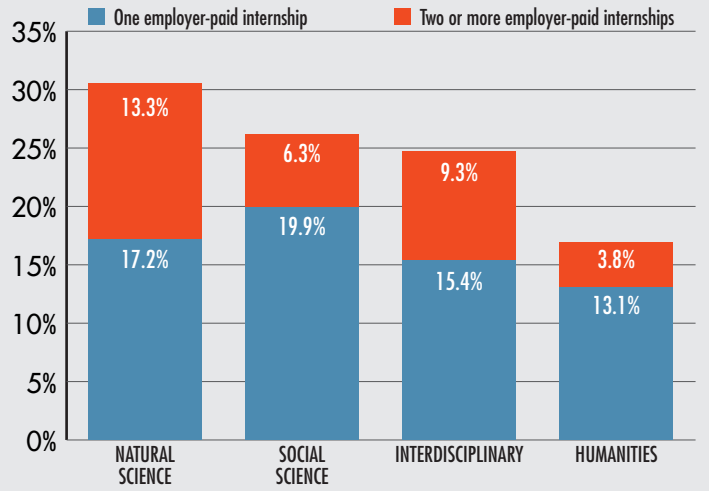
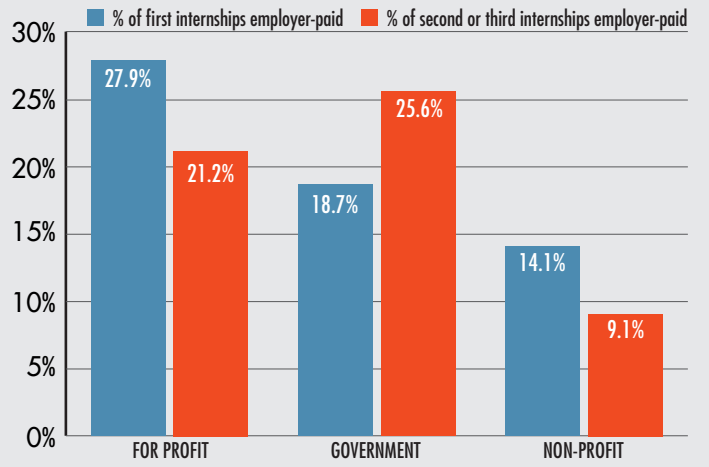


FIGURE 3 PERCENT OF INTERNSHIPS THAT WERE EMPLOYER-PAID, BY INDUSTRY



most non-profit organizations.

Unpaid Internships

Turning to unpaid internships, we find that they have many correlations. Like employer-paid internships, unpaid internships are shaped by field of academic major. Natural science majors (28.2 percent) were less likely than average to participate in unpaid internships, while social science (41.5 percent), humanities (51.1 percent), and interdisciplinary (45.4 percent) majors were more likely to have one or more unpaid internships. Those with a higher GPA were less likely to participate in an unpaid internship, as were Frances Perkins students. Those who were early and frequent users of the career center were also less likely to participate in an unpaid internship, which suggests that access to career services improves the odds of receiving payment for internships, likely college funding.

Confirming earlier research by Gardner,[22] wealthier students—those with little to no financial need—have a higher probability of completing an unpaid internship than students with moderate or high financial need. This underlines the economic barriers to internship access that the universal-funding program seeks to address.

There is no significant difference in the number of unpaid internships across industry of internships. This departs from earlier research and is probably explained by the fact that otherwise unpaid internships in non-profit organizations are eligible for college funding through the Lynk funding program at Mount Holyoke.

College-funded internships

Finally, looking at college-funded internships, we find that they reflect college programs and student accomplishments in addition to field of academic interest and industry characteristics. This is in contrast to employer-paid internships, which are only sensitive to academic major and industrial sector. College-funded internships were more likely to be completed in the non-profit sector; having an internship in the non-profit sector also is associated with having two or more college-funded internships, as Table 3b showed.

We also found that that traditional four-year students are less likely to have a college-funded internship, while natural science students are more likely than students from other majors to have a college-funded internship. Finally, those with higher GPAs who also use the career center prior to their first internship opportunity, and those with high financial need who use the career center prior to their first opportunity, are more likely to have a college-funded internship than no college-funded internship. The interaction between GPA and going to the career center prior to first internship also holds for two or more college-funded internships (analysis available on request).

Access

A final question for this project concerns the impact of universal college internship funding on student internship experiences. What evidence do we have that universal funding has improved access to internships for students of all profiles?

One kind of evidence is anecdotal. Our career and internship advisers have observed an increase both in use of the career center for internships and in the wider range of majors applying for internship funding. Faculty colleagues have written to thank us for providing funding in fields where there are very few paid internships available. The financial aid office contacted us in the first year of the Lynk program to inquire about the tenfold increase (from around 10 to 100) in students requesting a Summer Earnings Replacement Grant (SERG). The SERG is a grant available only to students in the very highest category of financial need in the context where they have won a funded internship. Finally, the college internship capstone course and associated internship symposium doubled and then tripled its enrollment since the introduction of Lynk funding in 2014. At the associated LEAP (Learning From Application) Symposium, many students thank the college for the funding that made it possible for them to participate in internships that would otherwise be out of reach.

Analysis of data from this project confirms the anecdotal evidence that college internship funding has broadened access

to internship participation among students who formerly did not participate. Table 5 shows that as students graduated in classes that had access to Lynk funding, there was a decline in the number of students who never completed an internship, from 25 percent in the graduating Class of 2013 down to 19.6 percent in the Class of 2015. Similarly, there was an overall decline in the number of students participating in unpaid internships, from a high of 46.1 percent in the graduating Class of 2013 down to 31.7 percent in the Class of 2015. Lynk internship funding was not available to students in the classes of 2013 and 2014, but in 2015, it accounted for 41.4 percent of internships funded. Under the previous system, in the graduating Class of 2013, only 28.9 percent of students participated in college-funded internships, and in 2014, the figure was 36.2 percent of students who participated in college-funded internships.

Internship funding prior to the introduction of the Lynk was highly competitive. Students with higher GPAs and natural science students were more likely to get internship funding than students with lower GPAs, or students in humanities or interdisciplinary fields. With the introduction of the Lynk, we moved to a situation in which we funded qualified internships rather than qualified students. In the Lynk context, significant differences between the GPA of students participating in internships disappeared.

Under the older internship-funding system, high-achieving students were also more likely to have two or more internships, while other students did not have a chance to participate in internships at all. With the introduction of universal funding, there is an increase in the number of students who participate in one internship and a corresponding drop in the proportion of students doing two or more internships.

Lynk internship funding has also reduced the effect of financial status on internship participation. While wealthier students under both funding systems were more likely to participate in unpaid internships, and in both systems, students with higher financial need were more likely to receive funding than students with low or no need, the introduction of Lynk funding has flattened the effect of financial need on internships. There is now a much smaller difference between students of different financial standing in their likelihood of receiving internship funding.

Importantly, the redistribution of internship funding has not affected the profile of students participating in internships in different industries. Roughly similar proportions of students participate in internships in the for-profit, government, and

TABLE 5

FUNDING SOURCE BY TOTAL NUMBER OF INTERNSHIPS, BY GRADUATING CLASS

		TOTAL NUMBER OF INTERNSHIPS			
	FUNDING SOURCE	0	1	2 +	TOTAL
2013	**No Internship**	**100.0%**			**25%**
	No funding		72.6%	53.5%	46.1%
	UAF (old system)		27.4%	46.5%	28.9%
	Lynk		NA	NA	NA
	Total	100% (153)	100% (190)	100% (269)	100% (612)
2014	**No Internship**	**100.0%**			**20.6%**
	No funding		64.4%	47.4%	43.3%
	UAF (old system)		35.6%	52.6%	36.2%
	Lynk		NA	NA	NA
	Total	100% (119)	100% (191)	100% (268)	100% (578)

TABLE 5 *cont.*

FUNDING SOURCE BY TOTAL NUMBER OF INTERNSHIPS, BY GRADUATING CLASS

	FUNDING SOURCE	TOTAL NUMBER OF INTERNSHIPS 0	1	2 +	TOTAL
2015	**No Internship**	**100.0%**			**19.6%**
	No funding		47.5%	33.9%	31.7%
	UAF (old system)		6.4%	11.0%	7.3%
	Lynk		46.1%	55.1%	41.4%
	Total	100% (123)	100% (204)	100% (301)	100% (628)
TOTAL	**No Internship**	**100.0%**			**21.7%**
	No funding		61.2%	44.5%	40.2%
	UAF (old system)		22.7%	35.7%	23.8%
	Lynk		16.1%	19.8%	14.3%
	Total	100% (395)	100% (585)	100% (838)	100% (1,818)

non-profit sectors now as in the past. This is an indication that the availability of these internships is determined by the willingness of employers to offer them and employ our students rather than the availability of ready funding.

Despite an overall increase in internship funding, a large proportion of internships sought by students remains unpaid. Students have either already used their college funding, they do not need funding, or they are using an unpaid internship to prepare for a more valuable employer-paid or college-funded internship later. This last strategy may be a conscious choice made by savvy students in industries in which there are few paid internship opportunities.

Discussion and Conclusion

We began this study with a model that assumes academic and demographic characteristics, student engagement in career-seeking behavior, and participation in internship opportunities during college all intersect to produce post-graduate outcomes. Our findings support this model and add to previous research by establishing that a student's total number of internships also predicts career outcomes six months after graduation. Below, we discuss implications of our findings for current practice and suggest directions for future research.

Our central finding is that internship participation does improve initial career outcomes. Students who participated in multiple internships had higher odds of being employed relative to seeking employment six months after graduation compared to those with no internships; they also had higher odds of being in graduate school relative to seeking employment compared to those with no internships. By documenting that internships have a positive impact on employment and graduate school outcomes at six months after graduation, our research adds to existing literature that suggests internships contribute to career success.

Previous research suggests that it is employer-paid internships—rather than unpaid internships—that have a positive impact on initial career outcomes. We suggest that future research investigate these findings further. It may be useful to tease out the specific effects of conversion of interns to post-graduate hires within the same organization from the effects of payment source on post-graduate outcomes overall and the total number of internships on post-graduate outcomes overall.

When we consider the impact of internships on student outcomes while in college, we find that international students, natural science majors, students with high GPAs, students who participated in reflection curriculum, and frequent users of the career center all had higher relative odds of internship participation, while non-traditionally aged students had lower odds of internship participation. The analysis supports our common-sense impression that participation in at least one internship is associated with higher use of the career center as well as academic strength expressed in a higher GPA. It indicates that academic and demographic characteristics, student engagement in career-seeking behavior, and participation in internship opportunities during college all intersect. It also reinforces our understanding that reflective curriculum and career center usage are important, and points to the need for continued institutional efforts to encourage student engagement in career-oriented activities, particularly among transfer student and non-traditionally aged student groups.

Future research that examines the direct impact of internship participation on GPA would further refine this picture. Studies might compare the pre-internship GPAs of students participating in internships with their post-internship GPAs to investigate whether academic performance improves alongside internship participation.

Our findings also underscore the central importance of academic performance, and suggest that advisers and practitioners should be careful to support students in setting priorities and allocating time to improve academic performance, and also to support internship experience over the course of their time in college.

Since the total number of internships matters to post-graduate outcomes, we examined the correlates of internship participation, and especially the odds of competing multiple internships. We found that being an international student, identifying as Asian-American or Latinx, having a natural science major, having a higher GPA, and participating in reflection curriculum all increase the likelihood of participation in two or more internships compared to doing only one; on the other hand, being a transfer student or a non-traditionally aged student decreases the odds of participating in multiple internships. We also find that students with the highest numbers of internships were more likely to have employer-paid or unpaid internships rather than college-funded internships. These findings support our assumptions that participation in two or more internships improves post-graduate outcomes and is associated both with a higher GPA and higher use of career services. However, our analysis also points to the importance of demographic characteristics and natural science study as predictors of student opportunities not articulated in our original hypothesis, and they suggest that payment source matters in different ways than assumed initially.

We conclude that college-funded internships are important to support students to participate in internships, especially those students who might not otherwise do so. Providing universal financial support for internships and maximizing student engagement with the career center are two ways we've approached support for internship participation. We also suggest that the question of how best to increase the percentage of students participating in two or more internships during their time in college is an important program development consideration for the future.

Our finding that participation in an employer-paid internship is best predicted by academic major and industry of internship implies that participation in employer-paid internships is largely driven by labor market factors and the availability of opportunities in industry sectors in which employer payment is the standard. Future assessment of the availability of competitive paid internships by specific industry sector would enable us to understand the labor market context in which students are pursuing paid internships. There is limited research on how participation in different types of internships may impact post-graduate outcomes, and further research on differences in types of internships by payment source and industry, and their relationships to employment and graduate school outcomes would be useful in understanding how to most effectively prepare students for different fields.

Since declaring a natural science major is associated with greater internship participation, we wonder whether we might learn from the internship progressions in the natural sciences in order to structure similar pathways for students in other fields. We are also interested in the extent to which these pathways are made possible by the specific nature of the labor markets and recruitment systems in these fields.

Earlier research suggests that paid internships are more commonly done by men than women, and in academic fields with a high proportion of male candidates.[23] It would therefore be useful to further explore gender differences in participation in different types of internships, and to consider if there are differences in the recruitment of female candidates to paid internships. Our findings are based on analyses of a predominantly female student population and are helpful in describing the internship behaviors of female students. Differences between our findings and those from studies that include a large population of male students may highlight areas for further investigation of gender differences.

Considering reflection curriculum, we find that participating in reflection curriculum is associated with higher odds of internship participation, as well as with higher odds of participating in two or more internships. Reflection curriculum did not independently affect the odds of being employed or in being in graduate school relative to seeking employment six months after graduation. This suggests that the impact of facilitated reflection on post-graduate outcomes is indirect and works in combination with internships to shape initial career outcomes.

We find little evidence to support the hypotheses that students who complete paid internships are more likely to secure full-time employment or graduate school enrollment within six months of graduation compared to students who completed unpaid internships. Rather, we find that it is the total number of internships and GPA that are the most important predictors of initial career outcomes. In fact, students with at least one employer-paid internship or at least one unpaid internship were twice as likely as those with a college-funded internship to complete two or more internships. This suggests that many of the students who completed a college-funded internship might not otherwise have participated in an internship opportunity without the college stipend. This also suggests that making college funding available to all students on a non-competitive basis may be a strategy to increase access to first and second internships for students who would not otherwise participate.

In providing college funding to support student participation in internships, we assess internships for quality. Those of us in the career center, along with our colleagues across academic departments and academic centers at the college, are especially concerned with the degree to which internships include structured learning opportunities for students. Future research may help to investigate whether assessing internships for their contributions to learning mitigates the differential impact on career success that paid and unpaid internships have shown in earlier research. This is a possible explanation for why our findings at Mount Holyoke depart from prior studies.

Finally, our findings confirm our expectation that the implementation of the Lynk internship program in 2014 broadened access to internships at the college. There was a decline in the percentage of students who never participated in an internship and a reduction in the effect of GPA and financial need on internship participation since the implementation of the Lynk.

In summary, our study yields several results that are novel in the context of the current research on internships. We find that the total number of internships a student participates in during her undergraduate career is a major predictor of positive career outcomes six months after graduation. Unsurprisingly, academic strength indicated by a high GPA is the other major predictor of initial career outcomes. In addition, we find that citizenship status is strongly associated with an increased likelihood of first internship participation. We find that the payment source of internships is important, and that payment source interacts in complex ways with academic major and industry, student characteristics, and total number of internships to reveal a multi-layered set of circumstances related to internship access, as well as the types of internships and career-seeking behaviors that impact a student's first destination after graduation. How we enable all our students to succeed academically, participate in internships, take advantage of multiple internship opportunities over the course of a college career, engage in career development activities, and understand and respond to the labor market realities are all critical institutional questions to consider as we strive to maximize post-graduate outcomes for our students.

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Appendix

Appendix 1. Non-Response

Table A models the relative odds of not responding to the query: "What is your primary activity at six months after graduation?"

TABLE A

RELATIVE ODDS OF NON-RESPONSE VS. RESPONSE (n=1818)

	B	S.E.	Odds Ratios
Student Type			
Transfer	-.098	.197	.907
Frances Perkins	-.652**	.206	.521
(base = Traditional 4 year)			
Citizenship			
Foreign	-.450**	.147	.638
(base = Domestic)			
Race			
White	.933***	.215	2.541
(base = non-White)			
Grade Point Average			
Medium GPA	.647***	.168	1.910
High GPA	.779***	.203	2.178
(base = Low GPA)			
Second Major			
Second major	.378**	.133	1.460
(base = One major)			
Frequency of Career Center Use			
1 to 3 career center visits	.095	.151	1.100
4 or more career center visits	.411**	.150	1.508
(base = No career center visits)			
Total Number of Internships			
1 internship	.256	.140	1.291
2 or more internships	.399**	.140	1.491
(base = No internship)			
Interaction GPA * Race			
White*Medium GPA	-.624**	.256	.536
White*High GPA	-.433	.291	.649
(base = Low GPA White)*			
Constant	-.780	.190	.458
Excluded category = response			

-2LL	*2330.276*
X^2	*120.634, df=12, 0<.001*
Nagelkerke R^2	*8.7%*
Classification accuracy	*64.2%*

The analysis shows that when queried about primary activity six months after graduation, student response is shaped by academic strength, and race and citizenship differences.

Academic strength is associated with higher odds of responding to institutional queries about initial career outcomes. Students with higher GPAs are more than twice as likely to respond as students with low GPAs. Declaring a double major is also likely to increase the odds of students responding versus not responding by about 50 percent with all other things being equal. In addition, the most frequent users of career services have significantly higher odds of responding compared to not responding, and net of CDC usage, there is an independent effect for the number of internships on response. Those who completed two or more internships are nearly 50 percent more likely to respond to a survey about initial career outcomes than those who had no internship.

The analysis also shows that, when compared to the response of traditional students, the odds of response are only half as high for Frances Perkins students, international students, and students with medium GPAs who are also white.

The finding for white students is revealing. All conditions being equal, white students were far more likely to respond to institutional queries about initial career outcomes than non-white students. There were no other significant race effects in non-response; they are captured fully by the white/non-white difference.

Looking more closely at non-response by "white vs. non-white" and citizenship in Table B, we see that whites are more likely than non-whites to respond at every GPA level, but that the rate varies by level. For students with low GPAs, non-whites respond nearly 40 percent of the time compared to whites, who respond about 60 percent of the time. For medium-GPA students, the difference is smaller, with non-whites responding 56.6 percent of the time compared to whites at 64.9 percent of time. Among high-GPA students, 53.3 percent of non-whites respond compared to 72.8 percent of whites. Higher GPA pushes white students' response rates even higher.

When comparing these results with those of international students in Table B, there is no interaction effect. Rather, we see that at every level of GPA, international students are about 10 to 11 percent less likely to respond than domestic students (the larger difference between high GPA international and domestic students in the high-GPA layer does not register as a significant interaction in the bigger model).

TABLE B

RESPONSE BY WHITENESS AND CITIZENSHIP (n=1818)

GPA		Non-White	White	Total	Domestic	International	Total
Low GPA	0	144	63	207	170	37	207
		60.3%	38.4%	51.4%	49.9%	59.7%	51.4%
	Responders	95	101	196	171	25	196
		39.7%	61.6%	48.6%	50.1%	40.3%	48.6%
	Total	239	164	403	341	62	403
		100	100	100	100	100	100
		0%	0%	0%	0%	0%	0%
Medium GPA	0	204	144	348	250	98	348
		43.4%	35.1%	39.5%	37.1%	47.6%	39.5%
	Responders	266	266	532	424	108	532
		56.6%	64.9%	60.5%	62.9%	52.4%	60.5%
	Total	470	410	880	674	206	880
		100	100	100	100	100	100
		0%	0%	0%	0%	0%	0%

TABLE B *cont.*

RESPONSE BY WHITENESS AND CITIZENSHIP (n=1818)

GPA		Non-White	White	Total	Domestic	International	Total
High GPA	0	99	78	177	100	77	177
		39.9%	27.2%	33.1%	28.2%	42.8%	33.1%
	Responders	149	209	358	255	103	358
		60.1%	72.8%	66.9%	71.8%	57.2%	66.9%
	Total	248	287	535	355	180	535
		100	100	100	100	100	100
		0%	0%	0%	0%	0%	0%
Total		447	285	732	520	212	732
		46.7%	33.1%	40.3%	38.0%	47.3%	40.3%
		510	576	1086	850	236	1086
	Responders	53.3%	66.9%	59.7%	62.0%	52.7%	59.7%
		957	861	1818	1370	448	1818
	Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix 2. Data Sources

Data were combined from several sources. Every effort was made to anonymize student data so individual students could not be identified.

Data about internships, summer undergraduate research, and related learning outcomes were compiled from five sources:

- **Inform Your Advisor:** This survey is delivered prior to students' accessing the online course registration system. Many students complete this survey when changing course registrations during the first three weeks of the fall semester; the remaining students complete it when registering for fall classes in mid-November. This survey collects pay, title, organization, industry, and location details on all student summer activities, and the results are published in January of the following year. Student-reported industries are often inaccurate, so industries will first be checked against any pre-existing organization data held by the college; if no record exists, the organization's industry will be identified through Dun & Bradstreet Business Information.

- **Lynk Universal Application Funding (UAF):** Program data is produced during the student application process for internship funding. The Lynk-UAF program provides a stipend to all eligible sophomores and juniors with qualifying internships, which is between 300 and 450 students each year. Program data also includes students funded through faculty research grants. Participants provide details on their internships or research activities, including pay, title, organization, industry, and location, and written reflections at the beginning and end of the summer.

- **The Intern Network:** This is a voluntary summer support group for all Lynk-UAF recipients, and any other student undertaking a summer internship or research project. Students report details of their summer activities, which are shared with other members of the Intern Network. The data are cleaned and curated by the career development center on an ongoing basis throughout the summer, as the center communicates with members of the Intern Network.

- **College 211:** "Reflecting Back: Connecting Internship and Research to Your Liberal Arts Education" is a course designed to support students to reflect critically on their summer learning experience and to articulate the learning that took place within the context of their broader liberal education at Mount Holyoke College.

- ***Six-Months Out Survey:*** This survey is designed to collect updated name, address, telephone, and e-mail information for new alumnae, as well as to solicit information on their current activities. The survey currently asks about a graduate's most meaningful summer and school-year experience in detail, including information about whether or not it was an internship experience. The annual survey is conducted online during December and January.

Data on student characteristics and career-related behavior were drawn from two sources:

- **Student GPA and academic data:** These data are drawn from student transcripts held in the registrar's office. These data were anonymized through a two-step blind process so individual students could not be identified.

- **CDC usage data:** These data are collected at each point of student engagement with the career development center, including advising, programs, and events, and are reported at the end of each academic year.

First destination results were compiled from three sources:

- ***Senior Survey:*** From late April through early May each year, the office of institutional research administers the *Senior Survey* online to all bachelor's degree candidates. This survey is an exit survey that solicits information about graduates' future employment and/or educational plans, and asks for graduates' reflections on their experience and satisfaction with their years at Mount Holyoke College.

- ***Six-Months Out Survey:*** See above.

- **Knowledge Rate Initiative:** As a pilot for the Class of 2014, the career development center staff collected first-destination employment information on alumnae who did not provide future employment or education information through either the *Senior Survey* or the *Six-Months Out Survey.* This information was collected through telephone follow-up, updates to profiles managed by the alumnae association, and public social media sources. This will be completed for the classes of 2013 and 2015 as well, following NACE's guidelines for use and verification of legitimate sources beyond survey responses[24].

In case of conflicts between data sources about a first destination, the sources were preferred in the following order:

1. *Six-Months Out Survey*

2. *Senior Survey*

3. Knowledge Rate Initiative

The rationale is that the *Six-Months Out Survey* solicits the most recent employment information from new alumnae, providing a more complete picture of alumnae success at that time. Both the *Senior Survey* and the *Six-Months Out Survey* provide information directly given by the alumna, and so it should be preferred over the information secured through the Knowledge Rate Initiative, which is gathered through alternative methods.

Appendix 3. Academic Major

Mount Holyoke, like many other liberal arts colleges, has academic departments in a wide range of academic fields. This is complicated further by patterns of double majoring, and also by declaring minors and various certificates. We also have a small population of students who declare self-designed interdisciplinary majors and minors. For this reason, we experimented with several different versions of the academic discipline variable: a six-category variable (natural science, social science, interdisciplinary, performing arts, languages, and traditional humanities), a four-category variable (natural science, social science, humanities, and interdisciplinary) and a three-category variable (natural science, social science, and humanities). We retained the four-category variable in the end, and observed that the interdisciplinary category behaves much like the social science category in most analyses. The specific coding is

presented below, and in some cases may reflect local curricular reality (e.g., African Studies in Humanities, but Gender Studies in Social Science).

- **Natural Science (n=358)**
  Astronomy, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Neuroscience and Behavior, Physics, Statistics.

- **Social Science (n=711)**
  Africana Studies, Anthropology, Economics, Environmental Studies, Gender Studies, Geography, International Relations, Politics, Psychology, Education, Sociology.

- **Humanities (n=474)**
  Ancient Studies, Architectural Studies, Art History, Art Studio, Asian Studies, Classics, Critical Social Thought, Dance, East Asian Studies, English, European Studies, Film Studies, French, German Studies, History, Italian, Latin, Medieval Studies, Middle Eastern Studies, Music, Philosophy, Religion, Romance Languages and Literatures, Russian and Eurasian Studies, Russian Literature and Cultures, South Asian Studies, Spanish, Latino/a, Hispanophone and Latin American Studies, Theatre.

- **Self-Designed Interdisciplinary Major or Cross-Divisional Double Major (n=275)**
  Defined by students in self-designed majors or who double major across two academic divisions.

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