IES Institute of Education Sciences

Appendix

Study of Enhanced College Advising in Upward Bound: Impacts on Where and How Long Students Attend College

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U.S. DEPARTMENT OF EDUCATION

Study of Enhanced College Advising in Upward Bound: Impacts on Where and How Long Students Attend College

November 2021

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INTRODUCTION

This appendix is a companion to the *Study of Enhanced College Advising in Upward Bound: Impacts on Where and How Long Students Attend College* report. The appendix provides additional information about the *Find the Fit* enhanced advising strategies and the study that assessed its effectiveness when implemented within Upward Bound projects. This additional information includes details on how the study was designed and conducted, the statistics that support key findings in the report, and exploratory analyses performed to further investigate and understand those key findings. The content of the appendix is referenced throughout the main report.

SECTION A. ADDITIONAL DETAILS ABOUT *FIND THE FIT*

This section provides additional information about *Find the Fit*, including the research on which it was based, details about *Find the Fit*'s three components, and the cost of *Find the Fit* to implement. This detail is intended to allow others to use or build upon *Find the Fit* as tested in this study.

A.1 Research-Based Strategies on Which *Find the Fit* Was Based

Find the Fit brought together promising strategies for college advising identified by research that was emerging alongside increasing interest in reducing the number of students who "undermatch"—meaning they do not enroll in college or do not enroll in the most selective college they likely could attend. These strategies had undergone rigorous study, but the evidence on these strategies was still developing. Strategies from these studies were combined into *Find the Fit*. Although these strategies had been tested with populations and in settings somewhat different from Upward Bound—for example, with high-achieving, low-income students or students with limited access to college advising— they addressed some of the common challenges that students like those in Upward Bound face in finding and enrolling in a college that is a good fit. This section describes the research that informed the key strategies in *Find the Fit* and the adaptations that were made to suit the Upward Bound program model and population of students.

Customized information about college opportunities, costs, and quality. In one study, low-income, high-achieving students who received customized information packets with information about applying to colleges, key milestones in the application process, and sample colleges to which they were admissible applied to and were admitted to more colleges, including more selective colleges that had higher graduation rates, than did students who had not received these packets.[1] The information sent to students was extensive, and the study specifically targeted high-achieving students who were not receiving much college advising and who would likely bear no cost if they attended a highly selective college because of generous financial aid packages. *Find the Fit* included student materials from that study, which were adapted to better reflect the diverse achievement and literacy levels of Upward Bound students and the likely costs they would face if enrolling at more selective colleges. Because of this variability, the similar *Find the Fit* content was tailored to the academic skills of each student, so that a student's sheet showed colleges to which a student was likely admissible, along with the colleges' graduation rates and average cost paid by low-income students. Further, because Upward Bound students already receive college advising through the program, Upward Bound advisors received guidance on how to integrate the student materials into their existing college advising.

Short activities to reduce students' fears of settling into and being successful in unfamiliar school environments. Psychologists have found that brief activities can reduce students' fears about fitting in or belonging in unfamiliar situations such as an unknown college.[2] For example, students exposed to a two-part activity—first reading about other students who initially felt that they did not belong in college but whose sense of not belonging dissipated over time, and then writing about how their own worries had changed over time—earned higher grades and reported being happier than did students who were not exposed to the activity.[3] Students in that study were college freshmen. With input from one of the study's principal investigators, Greg Walton, an activity was adapted for *Find the Fit* to instead target high school students looking ahead to college and perhaps feeling anxious about the transition to a new and unfamiliar setting. In *Find the Fit*, the activity involved hearing stories from college students, some of whom participated in the Upward Bound program, where they shared their stories of doubt and how they adapted to college. Upward Bound students then explored their own experiences where they had adapted and succeeded in unfamiliar setting or after initial setbacks.

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1 Hoxby and Turner 2013.

2 Aronson, Fried, and Good 2002; Yeager et al. 2014.

3 Walton and Cohen 2011.

Semi-customized text messages about college logistics. Several previous studies suggested that sending students semi-customized text messages increased college enrollment, college persistence, and Free Application for Federal Student Aid (FAFSA) completion for some groups of students. The text message customization varied but often included the students' name and information specific to the college they were attending or considering attending. Some of the students who received these messages were more likely to go to college or persist in college, particularly those enrolling or enrolled in two-year colleges.[4] Those students who benefitted might have been those who had less access to college-planning supports, or who were not far along with their college planning at the completion of high school. *Find the Fit* modified the text message content to be appropriate for the milestones that Upward Bound students would face in the college application process and to remind students about application deadlines, financial aid resources, *Find the Fit* materials, and key pre-enrollment steps for college, for example, reminders to register for orientation, and check health insurance options.

Concrete guidance on actionable steps. *Find the Fit* also incorporated key messages to encourage students to:

- <u>Apply to four or more colleges</u>. Research suggests that applying to more than one college significantly increases a student's chance of actually enrolling as well as the selectivity of the college where the student enrolls.[5] *Find the Fit* emphasized applying to four or more colleges and applying to more selective colleges. It did this because at the start of the study, College Board recommended students apply to at least four colleges to ensure a good fit and because attending a more selective college is associated with a higher chance of graduating and a shorter time-to-degree as well as higher earnings.[6]
- <u>Complete the FAFSA by early spring of their senior year.</u> Completing the FAFSA early opens up the most opportunities for institutional and state aid.[7] It also gives students accurate information about real costs before they must decide about which college to attend.
- <u>Examine graduation rates at different colleges to which they are likely admissible.</u> Providing guidance on selecting colleges that have high graduation rates and are a match with students' academic qualifications can increase students' chances of completing a four-year degree.[8]

Previous research suggests that low-income students often have limited information about the importance of the steps above.[9] Providing students with this type of guidance can lead to higher rates of enrollment in selective, four-year colleges and in enrollment shifts from two-year to four-year colleges.[10]

A.2 Details about *Find the Fit* Components

As described in the report, *Find the Fit* comprised three components, each of which had multiple elements. The components together aimed to address common challenges that low-income students face in finding and enrolling in a college that is a good fit for them. These challenges include financial hurdles, the logistics of applying to college, and limited expectations about the types of colleges that may be a good fit for students. Exhibit A.1 maps the *Find the Fit* components and the contents of each to these three key challenges. The section describes each of the components–personalized folders with student materials, text messages, and training webinars for advisors–in more detail.

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4 Castleman and Page 2015, 2016; Page, Castleman, and Meyer 2018.

5 Pallais 2015; Smith 2013.

6 The better outcomes for students at more selective colleges are likely due in part to the characteristics of students who attend these schools, including their stronger academic credentials, but could also be due to the institutional resources more selective colleges can provide (Bound, Lovenheim, and Turner 2010; Bowen, Chingos, and McPherson 2009; Dillon and Smith 2020; Horn and Carroll 2006; Howell and Pender 2016; Hoxby 2001; Smith 2013; Witteveen and Attewell 2017).

7 Cannon and Goldrick-Rab 2016; Feeney and Heroff 2013.

8 Roderick et al. 2008.

9 Bowen, Chingos, and McPherson 2009.

10 Avery 2013.

A.2.1 Personalized Student Folders

The *Find the Fit* personalized student folders contained 13 handouts, exercises, and activities personalized for each rising senior at Upward Bound projects that had access to *Find the Fit* (Exhibit A.1). Modeled on information folders previously evaluated,[11] some of the materials were customized for each student based on the student's academic preparation and geographic location. These customized materials included information on scholarships available in the student's state and sample colleges in that state and nearby states to which the student was likely admissible based on his or her academic preparation and achievement. Assembled in personalized folders, the materials were mailed to the Upward Bound projects in June 2015, the summer after students' junior year. Projects also received copies of a letter and parent-focused timeline that they could use to share *Find the Fit* information with parents. These materials were intended to be integrated into the college advising those Upward Bound projects already offered. It was anticipated that versions of some of the materials–for example, the application timeline and information on college application fee waivers–likely were available to many projects even before *Find the Fit* but they were included to connect other items in the folder. Thus for each of the materials, projects could decide whether to add it to the resources they used with students, replace an existing resource they previously used, or not use it.

11 See Hoxby and Turner (2013).

Exhibit A.1 Description of Content of Each *Find the Fit* Component and Mapping to Challenges Addressed

Component	Content	Challenge(s) Addressed
Personalized Student Folders	***Shuffle, Sort, and Stack*** activity to prompt thinking about a variety of factors, and which students value, in considering colleges	Limited Expectations
	Four Factors of Fit handout to promote thinking about a variety of factors, including academic quality, in considering colleges	Logistics of Applying, Limited Expectations
	College Application Timeline Reminders sheet of key steps in the college application process, including financial aid applications	Logistics of Applying, Financial Hurdles
	My College Planner booklet to track steps in the college application process	Logistics of Applying, Financial Hurdles
	My SCOOP–Sample Cost, Outcomes, and OPportunities Sheet for College that includes a customized set of example colleges to which that student is admissible, to demonstrate the range in out-of-pocket costs, show variation in institutional quality, and counter misinformation about college costs	Financial Hurdles
	Scholarships and Grants guide that emphasizes the importance of searching for a wide range of scholarships and grants to minimize financial burden	Financial Hurdles
	My College Search tracking sheet to record key factors about colleges being considered	Logistics of Applying, Limited Expectations
	Break Beyond the Familiar video and activity to encourage students to recognize their own ability to learn and grow in unfamiliar environments	Limited Expectations
	Discover Campus Support Services activity to identify support services and staff available at colleges of interest	Limited Expectations
	Start Your 2+2 Planning guide for planning transfer to a four-year college for those starting at a community college	Limited Expectations
	The Common Application information sheet to facilitate completion of the Common Application	Logistics of Applying
	College Admission Application Fee Waivers information sheet about waivers of college application fees	Financial Hurdles
	National Association for College Admission Counseling ***Request for Admission Application Fee Waiver*** form to facilitate submission of request for waiver of college application fee	Limited Expectations Financial Hurdles
24 Messages sent to Students (about twice per month)[a]	Real-time customized reminders to not miss key college application and pre-enrollment deadlines	Logistics of Applying
	Prompts to complete the FAFSA early; links to resources to find scholarships	Financial Hurdles
	Prompts to explore a variety of colleges	Limited Expectations
	Reminders to use *Find the Fit* materials	Logistics of Applying, Financial Hurdles, Limited Expectations

Component		Content	Challenge(s) Addressed
Advisor Training Webinars		Review of emerging research and promising practices, including consequences of attending less selective colleges than students could attend and benefits to enhancing students' feelings of social belonging and beliefs that intelligence can be increased with effort	Logistics of Applying, Financial Hurdles, Limited Expectations
		Training on use of *Find the Fit* student materials in the folders and text messaging	Logistics of Applying, Financial Hurdles, Limited Expectations

a: Students projects with a summer bridge program were sent an additional five messages during the summer between high school and college.

A.2.2 Messaging Program

To remind participants in real time about important steps in planning, targeting, applying, selecting, and enrolling in college, *Find the Fit* included a series of programmed messages sent to Upward Bound students. The messages were adapted from an earlier study that showed personalized text message reminders sent to high school students could increase their college enrollment rates.[12] The messages reminded students about key steps in the college search, application, and enrollment processes. Messages were sent via a web-based text messaging platform provided by the vendor Signal Vine. Signal Vine's platform allowed messages to be programmed and semi-customized and allowed advisors to send response messages to students via the platform. When students' cell phone number was not available, students were sent the messages through email instead. About one-quarter of students received email messages for this reason.

The messages began at the end of students' junior year (the start of *Find the Fit* programming) and continued until the end of students' senior year, or through the summer after high school for students in the 65 projects with access to *Find the Fit* whose Upward Bound programming extended through the summer. Messages were automatically sent out at important time points, such as prior to college application due dates. Students received about two programmed messages per month.

Messages were customized to include each student's first name, advisor's name, and information specific to the student's college plans. Customization was a key feature of the text messaging program because prior studies suggested that individuals are more likely to take action if the information they receive is relevant to them.[13] For example, students who provided a list of colleges to which they planned to apply, either through the initial student survey prior to the start of *Find the Fit* or in response to a fall programmed message asking them about their application plans, were automatically sent deadline reminders several weeks before each college's application was due. To include the deadline reminders and other college-specific information, the study team manually looked up key information about each college students planned to attend. Exhibit A.2 illustrates some of the messages sent to students. Exhibit A.3 describes the full set of programmed messages, including when messages were sent, the messages' focus, and the *Find the Fit* student materials mentioned in specific messages.

12 Castleman and Page 2015.
13 Castleman and Page 2015; Castleman, Schwartz, and Baum 2015; Karlan et al. 2010.

Exhibit A.2 Sample Text Messages

Hi Sara! Do u have a list of colleges on ur My College Search sheet? Use it to compare other Fit Factors and narrow down ur list. Talk to ur advisor if u need help.

Remember - as an Upward Bound student, u can waive many college application fees! Use this form http://bit.ly/ZSKdaI. Talk to ur advisor if u have questions.

Hi Camilla! Have u completed ur FAFSA? Do it before March 15 to get the most financial aid possible! https://fafsa.ed.gov/Txt 'HELP' if u need FAFSA help!

Hi Darryl, just a reminder that the appl for CSU-Chico is due on 11/30/2015! Talk to ur advisor if u need help finishing the application!

Exhibit A.3 *Find the Fit* Programmed Messages

Date Sent	Focus of Message	Student Material(s) Referenced
May 2015	Introductory message	
June 2015	Reminder to use college search tools (links to tools included)	*My College Search*
July 2015	Reminder to begin college application list	*My College Search*
August 2015	Encouragement to compare college costs after financial aid and to research campus support services	*My SCOOP Sheet for College; Discover Campus Support Services*
September 2015	Reminder to finalize college application list	*My College Search; My SCOOP Sheet for College*
October 2015	Request for students' college application list	
November 2015	Reminders to use application fee waivers and to check whether colleges accept the Common Application	*The Common Application; College Admission Application Fee Waivers*
Winter 2015-16	Automatically timed application deadline reminders; generic deadline reminder on December 15 for students who did not provide a college application list	
January 2016	Reminder and link to complete the FAFSA	
February 2016	Resources to search for scholarships; second reminder to complete the FAFSA	
March 2016	Reminder to check college graduation rates	
April 2016	Offer to help interpret financial aid award letter; request for students to reply with which college they planned to attend in the fall	

Date Sent	Focus of Message	Student Material(s) Referenced
May 2016	Second request for students' college choice	
June 2016	Reminders to get in touch with campus support services and to log in to the college's web portal to check key enrollment steps and deadlines	*Discover Campus Support Services*
July 2016	Reminders to register for orientation, plan for first tuition payment, register for placement tests, and check health insurance options	
August 2016[a]	Congratulation to students and good luck wishes	

a Sent in May 2016 to students in Upward Bound projects whose programming finished at the end of the school year rather than extending through the summer.

A.2.3 Training Webinars for Advisors

The study provided three live webinar trainings for Upward Bound advisors to educate them on the research underlying the *Find the Fit* materials and help them determine how to integrate these materials into their college advising. All staff who provided college advising to rising seniors in the Upward Bound projects with access to *Find the Fit* were encouraged to attend each webinar. Each webinar was about one to one-and-a-half hours and was offered at four different times in April or May 2015 so that advisors could attend at a date and time convenient for them. The webinars were also recorded and made available online. Each webinar, briefly described below, was led by a facilitator with extensive experience working to promote college access or improve educational success among low-income or minority students.

Webinar 1 – Why We Want to *Find the Fit*. The goal of the first webinar was to support advisors in addressing students' beliefs about college costs and emphasize the importance of attending a college that is a good match for students academically. This webinar provided an overview of the webinar series; described the tools and materials that *Find the Fit* was providing; explained that *Find the Fit* would enhance what advisors were already doing and that a focus on college "fit" and academic match could improve their students' college enrollment and persistence rates; and demonstrated how advisors could use some of the *Find the Fit* student materials in the folders.

Webinar 2 – Breaking beyond the Familiar: Empowering Students to Succeed in New Environments. The goal of the second webinar was to address students' potentially limited expectations about where they could be successful at college. This webinar focused on how to recognize students' beliefs or misconceptions that might affect the extent of their college search; how to use an activity shown to improve both students' perceptions that they can be successful and their actual academic success in unfamiliar situations; and how to take advantage of other resources that can increase students' comfort levels in applying to unfamiliar colleges. These resources include virtual campus tours and introductions to the federally funded Student Support Services programs at some colleges.

Webinar 3 – Making It Manageable: Timing, Tips, and Tools to Meet Logistical Challenges. The goal of the final webinar was to provide advisors with additional tools to motivate students to go through the logistics of selecting and applying to a range of colleges. The webinar summarized research on why applying to more colleges increases students' likelihood of enrolling; discussed important planning steps that students should take to make sure they stay on track throughout the entire application process; provided an overview of how text messaging can successfully nudge students to complete college application and enrollment tasks; and described the *Find the Fit* messaging program.

A.3 Costs of *Find the Fit*

For the study, *Find the Fit* was provided to Upward Bound projects at no cost. If Upward Bound projects chose to use *Find the Fit* in the future, the estimated cost to a project would be $13.50 per student.

The study estimated the cost using the "ingredient method." This method required first identifying all material and labor resources needed to carry out *Find the Fit* (Exhibit A.4). Then costs were attached to material resources, as those are the additional costs above and beyond regular Upward Bound programming costs. The Upward Bound program covers the labor costs of providing college advising to students.

The estimate includes two main costs, both of which are material costs: printing student materials for the personalized folders and the messaging platform. Printing the 35 pages of student materials on a standard laser printer is estimated to cost $5.24 per student. The messaging platform used by the study, Signal Vine, offers different pricing options depending on the number of students and groups, such as high schools, that participate and on the level of message customization and support provided. The cost of accessing a messaging platform similar to the one for this study would be $8.25 per student.

This cost estimate does not include costs associated with advisors' time, such as attending the training webinars or responding to student messages, under the assumption that advisors could shift how they spend their time to incorporate these activities rather than others. Additionally, this estimate does not include costs related to generating the student materials that were customized for each student based on the student's academic preparation and geographic location. Generating these materials requires looking up information for individual colleges, which students could do as part of their college search process.

Exhibit A.4 Estimated Cost to Upward Bound Projects of *Find the Fit*

Resource	Per Project Cost[a]	Per Student Cost
Materials		
Generate customized SCOOP sheets	n/a	n/a
Generate customized scholarship and grants sheets	n/a	n/a
Print student materials	$131.00	$5.24
Download advisor handbooks	n/a	n/a
Messaging Platform		
Access messaging platform	$206.25	$8.25
Advisors' Time		
Watch webinars	n/a	n/a
Explain materials to students	n/a	n/a
Collect college data for messages	n/a	n/a
Perform monitoring, data processing, and program maintenance for messaging	n/a	n/a
TOTAL COST	**$337.25**	**$13.49**

a Based on assumed project size of 25 students.

SECTION B. ADDITIONAL INFORMATION ABOUT HOW THE STUDY WAS DESIGNED AND IMPLEMENTED

This section provides details about how the study was designed and carried out to address the study's research questions. This detail is intended to document the study sample, data sources and measures, analytic methods, and the achieved power of the study to detect effects of *Find the Fit*. It should allow other researchers the opportunity to build on or replicate the study with other advising strategies or in other settings.

The study was designed to answer the following three key questions:

1. **Did *Find the Fit* improve college going among Upward Bound students? That is, did it reduce college undermatch, increase the selectivity of the colleges students attended, or increase postsecondary progress?** This central question informs whether *Find the Fit* could be a strategy for Upward Bound projects to integrate into their existing college advising to improve their students' college outcomes.

2. **To what extent did Upward Bound projects implement *Find the Fit*, and how did that implementation affect the college advising received by their students?**[14] These findings provide insight into how projects adopted *Find the Fit* and the extent to which it changed their practices.

3. **Are there impacts of *Find the Fit* for some subgroups of Upward Bound students or projects and not others?** This information could be useful to the program office in providing technical assistance to help Upward Bound projects improve their advising or to individual Upward Bound projects trying to determine whether adopting *Find the Fit* is appropriate for them.

B.1 Conceptual Framework of *Find the Fit*

The study was grounded in a conceptual framework of how *Find the Fit* would affect students' college-going behaviors. These details are provided to enable readers to understand how the *Find the Fit* components, when projects choose to integrate them into their college advising activities, were expected to influence project implementation and students' attitudes and behaviors (interim measures), which can serve as early indicators of college going (Exhibit B.1, below). The goal of *Find the Fit* is to reduce academic undermatch among Upward Bound students. Decreased undermatch, through increased college enrollment and enrollment at more selective colleges, is then expected to lead to higher rates of college persistence and completion. The study's first report provides more details on how *Find the Fit* was implemented and affected students' interim attitudes and behaviors.[15]

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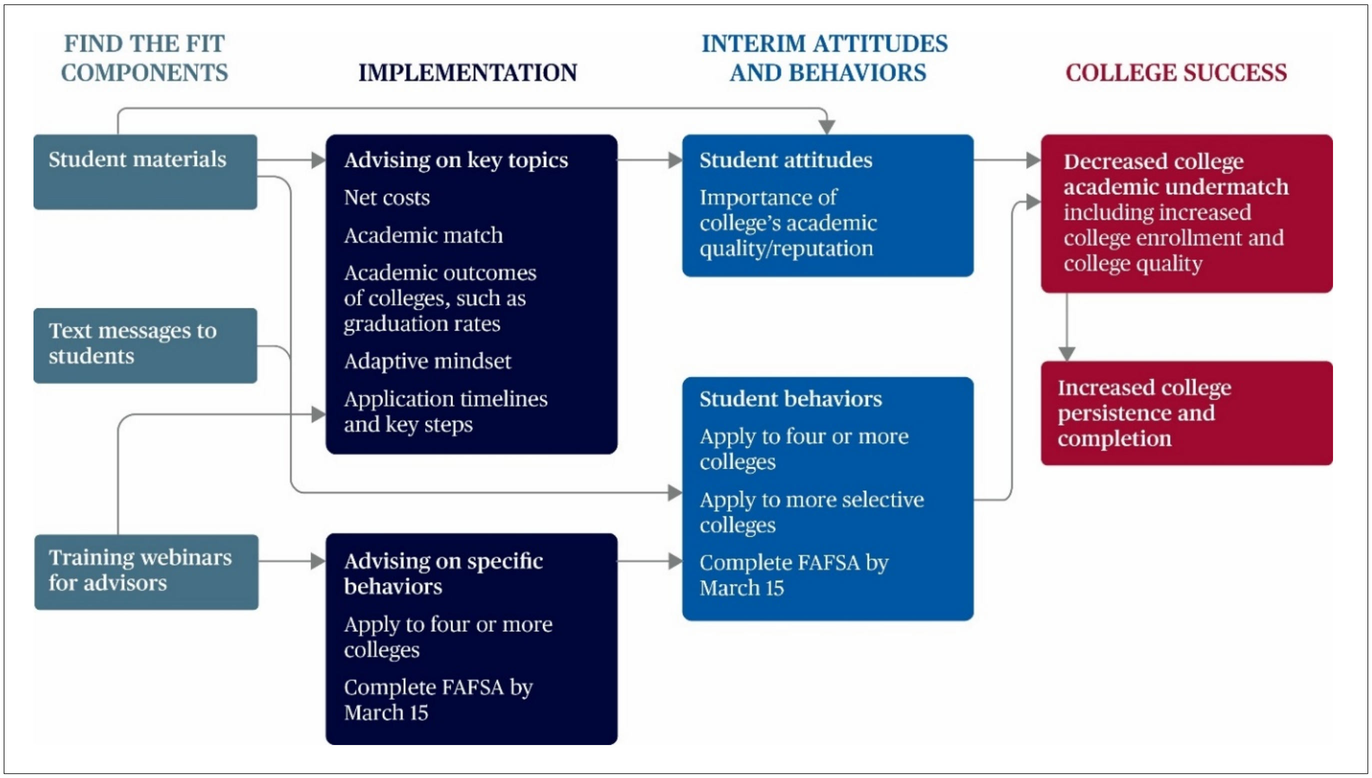
14 The study's first report (Martinez et al. 2018) addressed this research question.

15 Martinez et al. 2018.

Exhibit B.1 Study's Conceptual Framework of How *Find the Fit* Influences College Success



Notes: Arrows show how *Find the Fit's* components, if integrated by Upward Bound projects into their college advising activities, are expected to influence advising and interim outcomes and how the interim outcomes might influence the later outcomes.

B.2 Study Design

The study team recruited Upward Bound projects to participate in the study and randomly assigned projects either to offer the enhanced advising–*Find the Fit*–to high school seniors during the study period or to offer regular Upward Bound advising to seniors during the study period. This section describes how the study team recruited Upward Bound projects and students for the study and how projects were randomly assigned.

B.2.1 Study Sample

The study aimed to serve students who were 2015-16 high school seniors, in order to have sufficient time during the study period to follow participating students into and through some of their college experience. Therefore, the study focused on regular Upward Bound projects funded with fiscal year (FY) 2012 funds as these projects were expected to have their group of students reach senior year in high school in 2015-16.

To identify eligible projects, the study used information maintained by the Department of Education on the Upward Bound awards granted in FY 2012. All 823 regular Upward Bound awards funded with FY 2012 funds were eligible to participate in the study. Awardees that shared staff or brought together students across awards to provide services were treated as single projects for this study. This ensured that all Upward Bound students served by the same staff or host institution would either have access to the study's enhanced advising–*Find the Fit*–or not, minimizing the potential of spillover from the enhanced advising group to the regular advising group. Thus, the 823 awards formed 702 eligible Upward Bound projects. The study intended to recruit 200 of the 702 projects (see Section B.4.3 for statistical analyses to determine the needed sample size). Ultimately, 194 projects volunteered to participate in the study. These 194 projects served 4,443 rising 2015-16 seniors.[16]

[16] An additional 11 rising 2015-16 seniors served by the study projects were excluded from the study prior to random assignment because their parents did not grant consent for them to participate. Six of these students were in projects later assigned to the group receiving *Find the Fit* and five were in projects later assigned not to receive it.

Projects participating in the study were not randomly selected from the full set of eligible projects to statistically represent the Upward Bound program overall. However, the similarity of participating projects to all eligible Upward Bound projects suggests that results from the study could be used to inform decisions about whether to implement *Find the Fit* in other Upward Bound projects. Exhibit B.2 shows that projects in the study were similar to all eligible Upward Bound projects on important dimensions–they were primarily hosted by four-year colleges (57 percent), with almost half located in city settings (49 percent), and spanned all regions of the United States.

Exhibit B.2 Characteristics of Study Projects versus All Eligible Upward Bound Projects

Project Characteristic	Study Projects (%)	All Eligible Projects (%)
Host Institution Type		
Four-year college	56.7	58.5
Two-year college	31.4	31.3
Not a college (Other)	11.9	10.1
Locale		
City	49.0	48.8
Suburb	17.0	19.7
Town	22.2	22.7
Rural	11.9	8.7
Region		
Northeast	14.4	14.5
Midwest	27.3	22.5
South	37.1	36.8
West	19.6	23.6
Other	1.5	2.6
Minority-Serving Host Institution		
Yes	22.2	28.2
Project Historical College Enrollment Rate		
Percentage of students who enrolled in college	85.1	85.0
Project Size	**(Mean)**	**(Mean)**
Number of students	73.1	73.2
TOTAL N	194	702

Sample Sizes:

Host institution type, region, minority-serving host institution, and project size: Study = 194 projects, All = 702 projects.

Locale: Study = 194 projects, All = 633 projects.

Project historical college enrollment rate: Study = 186 projects, All = 672 projects.

Source: APR 2014-15; IPEDS 2015-16.

Likewise, students in the study projects who were rising 2015-16 seniors were similar to rising seniors in all eligible Upward Bound projects (Exhibit B.3). In both participating projects and all eligible projects, more than half of Upward Bound students were female (64 percent), they most commonly had a GPA of a B or better (71 percent), and they were primarily students of color (about two-thirds Black, non-Hispanic or Hispanic). These similarities suggest that results based on students in the study sample are generalizable to the broader population of Upward Bound students.

Exhibit B.3 Characteristics of Students in Study Projects versus Students in All Eligible Upward Bound Projects

Student Characteristic	Students in Study Projects (%)	Students in All Eligible Projects (%)
Gender		
Female	64.0	64.0
Race/Ethnicity		
Hispanic	25.8	30.1
White, non-Hispanic	23.4	21.4
Black, non-Hispanic	38.6	37.4
Other, non-Hispanic	12.2	11.1
Household Characteristic		
Low-income household	87.6	88.1
First generation to college	91.7	92.2
High School Course Taking		
Taken one or more AP/IB course	34.4	33.4
Unweighted Cumulative GPA		
3.7-4.0 (mostly As)	18.4	16.5
2.7-3.6 (mostly Bs)	52.4	55.3
1.7-2.6 (mostly Cs)	26.2	25.5
1.0-1.6 (mostly Ds)	2.8	2.5
0.0-0.9 (mostly Fs)	0.2	0.3
College Entrance Exam Score Quartile		
Highest quartile	4.9	[a]
Second quartile	12.0	[a]
Third quartile	18.6	[a]
Lowest quartile	37.5	[a]
Missing score	27.0	[a]
Total N	4,443	18,487

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.

[a] College entrance exam scores were available only for students in study projects.

Sample Size: Rising high school seniors in study projects = 4,443, Rising high school seniors in all eligible Upward Bound projects = 18,487.

Source: APR 2012-13 to 2014-15; college entrance exam data 2015.

B.2.2 Random Assignment

The goal of random assignment was to create two study groups—projects providing *Find the Fit* and those providing regular Upward Bound (UB) advising—that were similar on characteristics likely to be related to college undermatch, enrollment, and persistence. That way, any differences that were seen in college-going behaviors between the two groups could be attributed to *Find the Fit* rather than to initial differences between the groups.

During the study period, students in both *Find the Fit* and regular UB advising projects continued to receive Upward Bound's existing services that could include:

- Academic tutoring and instruction to prepare students to complete secondary or postsecondary courses.
- Guidance on high school course selection.
- College advising.
- Assistance in preparing for college entrance exams such as the SAT and ACT.
- Information on all federal student financial aid programs and benefits, as well as resources for locating public and private scholarships.
- Assistance in completing college admission and financial aid applications.
- Education or counseling services to improve the financial and economic literacy of students and their parents, including financial planning for postsecondary education.

After the 194 Upward Bound projects and their 4,443 rising 2015-16 seniors had been identified and recruited, the projects were randomly assigned though a lottery to receive *Find the Fit*. Projects had a 50 percent chance of being assigned to either group—that is, for every project assigned to provide *Find the Fit* and regular UB advising, a project was assigned to provide regular UB advising. As part of the recruitment strategy, projects that volunteered were all promised the opportunity to receive *Find the Fit*, if not right away, as an incentive to volunteer. Projects randomly assigned to the *Fit the Fit* group received it during the study. Projects randomly assigned to the regular UB advising group got access to *Find the Fit* only after the 2015-16 seniors had left Upward Bound projects and the study had concluded. Thus, there is little possibility that students in the regular UB advising group experienced *Find the Fit* during the study period (that is, it is unlikely that the regular UB advising group was "contaminated" by access to *Find the Fit* advising).

To both prevent a bad draw by chance (for example, more *Find the Fit* projects in urban settings than were regular UB advising projects) and to enhance the study's ability to examine impacts of *Find the Fit* for key groups[17] of Upward Bound projects, projects were divided into eight groups ("randomization blocks") created by the combination of their host institution type (four-year or not) and their geographic locale (city, suburb, town, or rural) for random assignment. Within each block, half the projects were randomly assigned to the *Find the Fit* group and the other half to the regular UB advising group. Exhibit B.4 shows the number of *Find the Fit* and regular UB advising projects in each randomization block.[18] Of the 194 study projects, 98 were randomly assigned to the *Find the Fit* group and 96 to the regular UB advising group.

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17 See Exhibit B.16 below for details on the rationale for including these measures as key subgroups in the study.

18 Some of the randomization blocks had an odd number of projects to be assigned to each group, this resulted in two more projects being assigned to the *Find the Fit* group than the Regular UB advising group overall.

Exhibit B.4 Host Institution Type and Locale of Study Projects, by Random Assignment Status

Randomization Block	*Find the Fit* Group Projects (N)	Regular UB Advising Group Projects (N)	All Projects (N)
Four-year host institution/City	29	29	58
Four-year host institution/Suburb	10	9	19
Four-year host institution/Town	13	13	26
Four-year host institution/Rural	3	4	7
Non-four-year host institution/City	20	17	37
Non-four-year host institution/Suburb	7	7	14
Non-four-year host institution/Town	8	9	17
Non-four-year host institution/Rural	8	8	16
Total N	98	96	194

Sample Size: *Find the Fit* group = 98 projects, Regular UB advising group = 96 projects.
Source: IPEDS 2015-16.

As expected, the random assignment procedures resulted in *Find the Fit* and regular UB advising groups comprising projects with similar characteristics measured before the lottery (or at "baseline") (Exhibit B.5).

Exhibit B.5 Characteristics of Study Projects before the Lottery, by Study Group

Project Characteristic	*Find the Fit* Group Projects (%)	Regular UB Advising Group Projects (%)	Estimated Difference	*p*-Value[a]
Host Institution Type				
Four-year college	56.1	57.3	-1.2	.870
Two-year college	31.6	31.3	0.4	.955
Other	12.2	11.5	0.8	.866
Locale				
City	50.0	47.9	2.1	.773
Suburb	17.3	16.7	0.7	.900
Town	21.4	22.9	-1.5	.804
Rural	11.2	12.5	-1.3	.785
Region				
Northeast	14.3	14.6	-0.3	.953
Midwest	25.5	29.2	-3.7	.570
South	36.7	37.5	-0.8	.913
West	22.4	16.7	5.8	.313
Other	1.0	2.1	-1.1	.551
Minority-Serving Host Institution				
Yes	26.5	17.7	8.8	.141
Project Historical College Enrollment Rate				
Percentage of students who enrolled in college	84.9	85.6	-0.8	.627
Project Size	**(Mean)**	**(Mean)**		
Number of students	76.0	70.1	5.9	.089

[a] *p*-Values are for tests of whether there was a statistically significant baseline difference in the characteristic in the row.
Sample Sizes: Host institution type, locale, region, minority-serving host institution, and project size: *Find the Fit* group = 98 projects, Regular UB advising group = 96 projects. Project historical college enrollment rate: *Find the Fit* group = 93 projects, Regular UB advising group = 93 projects.
Source: IPEDS 2015-16.

Across the 194 projects, 4,443 students participated in the study: 2,336 students from *Find the Fit* projects and 2,107 students from regular UB advising projects. As expected, the students in the *Find the Fit* and regular UB advising groups had similar characteristics before the lottery (Exhibit B.6). Thus, any differences in undermatch, college selectivity, and college persistence can be attributed to *Find the Fit* rather than to initial differences between the groups.

Additional information on the similarities (or "baseline equivalence") of the samples used to assess the effect of *Find the Fit* on other measures of students' college going is presented in Section B.4.2.

Exhibit B.6 Characteristics of Students before the Lottery, by Study Group

Student Characteristic	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference	*p*-Value[a]
Gender				
Female	64.4	63.8	0.6	.721
Race/Ethnicity				
Hispanic	27.5	23.0	4.5	.310
White, non-Hispanic	21.9	24.9	-3.0	.460
Black, non-Hispanic	38.6	39.0	-0.4	.940
Other, non-Hispanic	12.0	13.1	-1.1	.695
Household Characteristic				
Low-income household	88.0	87.5	0.4	.744
First generation to college	91.2	92.2	-1.0	.363
Academic Characteristic				
Taken one or more AP/IB courses	36.6	31.4	5.2	.156
Unweighted cumulative GPA (mean)	3.1	3.0	0.0	.571
College entrance exam (SAT score)	874.3	862.4	11.8	.323
Baseline Proxy				
Planned to apply to college	90.1	88.1	2.0	.081
Undermatched at all colleges where planned to apply	19.2	21.6	-2.4	.213

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.

a p-Values shown in this column are for tests of whether there was a statistically significant baseline difference in the characteristic in the row.

Notes: The *Find the Fit* group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects.

Sample Sizes:

Gender: *Find the Fit* group = 2,318 students, Regular UB advising group = 2,102 students.

Race/ethnicity: *Find the Fit* group = 2,311 students, Regular UB advising group = 2,099 students.

Low-income household: *Find the Fit* group = 2,310 students, Regular UB advising group = 2,088 students.

First generation to college: *Find the Fit* group = 2,317 students, Regular UB advising group = 2,101 students.

AP/IB course taking: *Find the Fit* group = 2,305 students, Regular UB advising group = 2,085 students.

GPA: *Find the Fit* group = 1,969 students, Regular UB advising group = 1,855 students.

College entrance exam score: *Find the Fit* group = 1,745 students, Regular UB advising group = 1,499 students

Planned to apply to college: *Find the Fit* group = 1,882 students, Regular UB advising group = 1,701 students

Undermatched at all colleges where planned to apply: *Find the Fit* group = 1,840 students, Regular UB advising group = 1,669 students.

Source: APR 2012-13 to 2014-15; college entrance exam score data 2015; baseline student survey 2015.

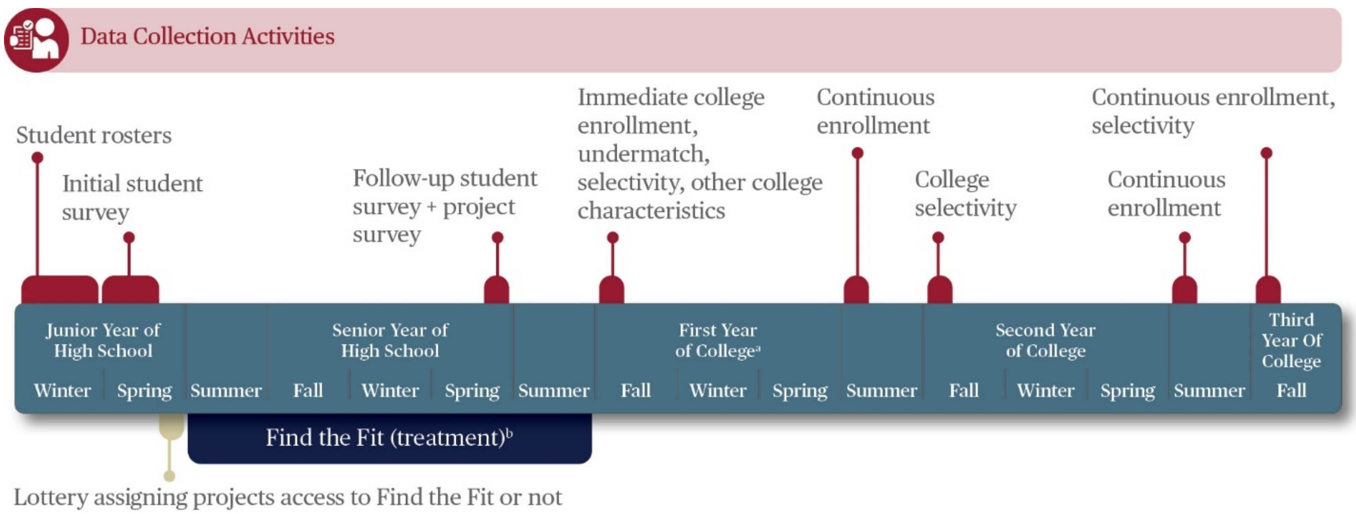
B.3 Data Collection

The study team collected data from several sources to assess the effects of *Find the Fit* and describe its implementation. This section presents the timing of data collection and then details about the data sources used to create the study measures.

B.3.1 Timing of Data Collection for the Study

The study began following students in spring 2015 at the end of their junior year of high school, at which time they completed the study baseline student survey. The study followed students through their senior year in 2015-16, during which time the *Find the Fit* group projects had access to *Find the Fit*. The study then continued following students into college. College-going measures for this report are observed the first year after students' expected high school graduation (2016-17) through fall 2018, the start of students' expected third year in college. Exhibit B.7 illustrates the timing of data collection relative to the timing of *Find the Fit* delivery and key education milestones such as students' junior and senior years of high school and their first three years of college.

Exhibit B.7 Timing of Data Collection, Lottery, and *Find the Fit* Delivery



B.3.2 Data Sources Used to Obtain Study Measures

Data came from three surveys conducted for this study, as well as from administrative data maintained by the Department of Education and other sources. Exhibit B.8 provides detailed information on each of the study's data sources.

Exhibit B.8 Data Sources, Including the Sample, Timing of Data Collection, Response or Coverage Rate, and Content Used for Each

Data Source	Sample	Timing of Data Collection	Response Rate (*N*)			Data Obtained
Study Surveys[a]			**Overall**	***Find the Fit* Group**	**Regular UB Advising Group**	
Baseline student survey (pre-*Find the Fit*)	4,443 students	Spring 2015	80.6% (3,583)	80.6% (1882)	80.7% (1701)	Students' college-going expectations and plans; demographic characteristics
Follow-up student survey	4,443 students	Late Spring 2016	81.7% (3,630)	82.2% (1920)	81.2% (1710)	College advising that students received; number of applications submitted; use of *Find the Fit* materials (*Find the Fit* group only); colleges to which students applied
Project survey[b]	194 project directors	Spring 2016	94.8% (184)	95.9% (94)	93.8% (90)	Features of the college advising offered to students over the study period; use of *Find the Fit* materials (*Find the Fit* group only)
Administrative and National Data			**Overall**	***Find the Fit* Group**	**Regular UB Advising Group**	
Student rosters	194 projects	Winter 2014	100% (194)	100% (98)	100% (96)	Records of students who would be rising seniors in the participating Upward Bound projects
Upward Bound Annual Performance Reports (APRs)	194 projects	School Year 2014-15	100% (194)	100% (98)	100% (96)	Reports submitted by each Upward Bound project with information on projects and participating student characteristics
Integrated Postsecondary Education Data System (IPEDS)	1,158 colleges[c]	School Year 2015-16	100% (1,158)	100% (772)	100% (698)	Data on college characteristics
NCES-Barron's Admissions Competitiveness Index	1,158 colleges[c]	Selectivity Ratings for 2014	56.5% (654)[d]	61.5% (772)	59.5% (698)	Classifications of four-year U.S. colleges by relative competitiveness of admissions
Education Longitudinal Study (ELS) of 2002	15,000+ students	Spring 2004	N/A[e]	N/A	N/A	Academic information for a nationally representative sample of high school students
National Student Clearinghouse (NSC)	4,443 students	NSC: Fall 2016, 2017, 2018	N/A[f]	N/A	N/A	Student-level information on college enrollment

Data Source	Sample	Timing of Data Collection	Response Rate (*N*)			Data Obtained
Federal Student Aid (FSA) data	4,443 students	Fall 2016, 2017, 2018, 2019	N/A[g]	N/A	N/A	Student-level information on receipt of federal student aid (such as Pell grants, Federal Work-Study) documenting college enrollment, college to where which federal aid was sent, and FAFSA completion
College Board and ACT college entrance exam data	4,443 students	School Year 2013-14 School Year 2014-15	73.0% (3,244)	74.7%	71/1%	Records of student scores on the SAT, ACT, PSAT, and PLAN prior to the start of *Find the Fit* (June 2015)
			Overall	*Find the Fit* Group	Regular UB Advising Group	
Program monitoring data	94 *Find the Fit* projects; 2,336 students	School Year 2015-16	100% (94 *Find the Fit* projects, 2,336 students)	100% (94 *Find the Fit* projects, 2,336 students)	NA	Records of advisors' attendance in training webinars, and analytics from the texting platform on messages sent to and received by students

[a] The study survey instruments can be found at: https://www.reginfo.gov/public/do/PRAICList?ref_nbr=201508-1850-001
[b] Project directors were asked to complete the survey themselves or assign it to the staff person who was most familiar with their project's advising. About 63 percent of project surveys were completed by project directors.
[c] Data were collected for all colleges students attended in the fall of the first, second, and third years after high school, which were identified in either the National Student Clearinghouse or in the Federal Student Aid database. The IPEDS data were used to determine characteristics of the colleges attended, including cost. The Barron's Admissions Competitiveness Index data were used to determine the selectivity level of the college attended and academic undermatch. Of the 1,158 colleges students attended, there were 312 colleges attended by students in both *Find the Fit* and Regular UB Advising groups, 460 colleges attended only by students in the *Find the Fit* group, and 386 colleges attended only by students in the Regular UB Advising group. The total number of colleges attended by students in the *Find the Fit* group was 772 (312 + 460). The total number of colleges attended by students in the Regular UB Advising group was 698 (312 + 386).
[d] Percentage and number of colleges found in the Barron's Admissions Competitiveness Index database. The Barron's selectivity level was able to be classified for the 56.4% of colleges found in the database. The selectivity of an additional 43.5% of colleges was able to be classified as either a four-year college (125) or a two-year college (379). Less than 1 percent (0.1%) of students attended colleges that could not be found in either the Barron's database or IPEDS.
[e] A response or coverage rate for the ELS is not applicable because data from the ELS were not matched to the students in the study sample. Instead, data from the ELS were used to predict the selectivity level of colleges to which students were admissible based on their academic credentials. The ELS prediction model was then applied to students in the study sample.
[f] Of the 4,443 students in the study sample, enrollment records were found in both NSC and FSA for 50.1% of students (2,226), in NSC only for 10.5% of students (466), and in FSA only for 11.4% of students (507). Students who do not have any enrollment record (28.0% or 1,244 students) are classified as not having achieved the outcome—for example, not having enrolled in college. Thus, they do *not* have missing values for variables constructed from these data sources.
[g] Of the 4,443 students in the study sample, FAFSA submission records were found for 3,799 (85.5%). Students who do not have a FAFSA submission record are classified as not having completed the FAFSA. Thus, they do *not* have missing values for this outcome.

B.4 Analytic Methods

The study created measures about students' college going and estimated the effectiveness of *Find the Fit* on these measures of college going for all students and for particular groups of students and projects ("subgroups"). This section describes the approach for examining the effects of *Find the Fit*. First, the section describes the study measures, the rationale for selecting each measure, and how the measures were constructed. Then the section provides details on the study's analytic methods, including the samples and methods used to estimate effects of *Find the Fit* on students' college-going measures. Finally, the study's achieved power to detect effects of *Find the Fit* for each measure is provided.

B.4.1 Study Measures

Student College-Going Measures

The study examined the effects of *Find the Fit* on multiple measures of college going (see Exhibit B.9 below for details about the rationale for each measure). Study measures most directly related to the hypothesized effects of *Find the Fit* are discussed in the report and are the main or confirmatory outcome measures. These include (1) college academic undermatch, (2) the selectivity level of the college attended in the year after high school, and (3) persistence into the third fall after high school or graduation by that time.

Exhibit B.9 defines each main outcome measure, including the rationale for selecting the measure, how it was constructed, and missing data rates. All of these measures were constructed for the full sample of students, and there were no missing data for any of the main outcome measures except college academic undermatch. Data on college academic undermatch was missing for students who were missing data on their academic credentials. That information was necessary to predict the highest selectivity of college to which they could be admissible, a key component of calculating undermatch.

In addition, the study examined effects of *Find the Fit* on exploratory measures, related to the selectivity level of the college attended in intervening years, persistence in years prior to the third fall after high school, and other characteristics of the colleges students attended. These exploratory measures are described in Exhibit B.9, with results shown in Section C.

Exhibit B.9 Construction of Outcome Measures Based on Full Randomized Sample and Percentage of Students Missing Data

Domain[a]	Outcome	Rationale	Data Source	Construction	Percentage of Students Missing Data		
					***Find the Fit* Group**	**Regular UB Advising Group**	**Overall**
College Enrolment	Undermatch	**Main/ measure** *Find the Fit* encouraged students to change their college application behaviors to reduce academic undermatch, which could be linked to longer-term outcomes such as persistence, completion, and earnings.	NSC, FSA, NCES-Barron's Admissions Competitiveness Index, IPEDS, ELS, APRs, College Board and ACT	1 = The student was not enrolled in college on Oct. 1, 2016, or the college the student enrolled in had a selectivity level lower than the highest selectivity level to which the student had a high probability of admission given her/his academic credentials 0 = The student was enrolled (on Oct. 1, 2016) at a college with a selectivity level equal to or higher than the highest selectivity level to which the student had a high probability of admission given her/his academic credentials	2.7	5.3	3.9

Domain[a]	Outcome	Rationale	Data Source	Construction	Percentage of Students Missing Data		
					***Find the Fit* Group**	**Regular UB Advising Group**	**Overall**
College Enrollment	Selectivity level of college that student attended *(constructed for each year after high school Year 1: 2016 Year 2: 2017 Year 3: 2018)*	*Find the Fit* encouraged students to attend the college with the highest selectivity level to which they have access. Selectivity may be linked to college persistence and completion as well as earnings, and as such is a measure of quality. **Main/ measure** Barron's selectivity ranking of college that student attended in year after high school (Oct. 1, 2016) **Exploratory measure** The study also examined this outcome in the second and third years after high school to determine whether *Find the Fit* had an ongoing impact on the selectivity of the colleges that students attended (Oct. 1, 2017; Oct. 1, 2018)	NSC, FSA, NCES-Barron's Admissions Competitiveness Index, IPEDS	For each of the three years after high school (Oct. 1, 2016, 2017, and 2018), **seven variables were constructed using each Barron's selectivity level[b] and two-year colleges**: most competitive, highly competitive, very competitive, competitive, somewhat competitive, any four-year college, or any college (two- or four-year) 1 = The college where the student was enrolled on Oct. 1 had a given selectivity level or higher 0 = The student was not enrolled in college, or the college the student attended had a lower selectivity level	0.0	0.0	0.0

Domain[a]	Outcome	Rationale	Data Source	Construction	Percentage of Students Missing Data		
					Find the Fit Group	Regular UB Advising Group	Overall
Progressing in College	Persistence	*Find the Fit* encouraged students to attend the college with the highest selectivity level to which they have access, with the goal of increasing persistence and completion. **Main measure** Continuous college enrollment into the third fall after high school (Oct. 1, 2018) or graduation by that time **Exploratory measure** The study also examined continuous college enrollment through the first year and the second year after high school or graduation by each time point	NSC, FSA	A measure of continuous college enrollment or graduation was constructed for three time periods: through the first year after high school (July 1, 2016-June 30, 2017), through the first two years after high school (July 1, 2016-June 30, 2018), and into the third fall after high school (July 1, 2016-Oct. 1, 2018) 1 = The student was enrolled in college throughout the given time period, with no break in enrollment of more than 5 consecutive months, **or** was enrolled on Oct. 1, 2016, and graduated from a two- or four-year college during the period 0 = The student was not continuously enrolled in college and did not graduate from a two- or four-year college during the period	0.0	0.0	0.0
NA	Familiarity of the college attended (host institution)	**Exploratory measure** *Find the Fit* encouraged students to consider attending less-familiar colleges, beyond the Upward Bound host institution, to improve college selectivity and reduce undermatch.	NSC, FSA, APRs	1 = Student was enrolled in Upward Bound host institution in the fall after high school (Oct. 1, 2016) 0 = Student was enrolled in a college other than the Upward Bound host institution, **or** was not enrolled in college in the fall after high school (Oct. 1, 2016)	0.0	0.0	0.0

Domain[a]	Outcome	Rationale	Data Source	Construction	Percentage of Students Missing Data		
					Find the Fit Group	Regular UB Advising Group	Overall
NA	Transfer to a less selective college or drop out by the second fall after high school	**Exploratory measure** The study explored whether there were any unintended consequences of encouraging students to attend more selective colleges. Specifically, students who enroll in more selective colleges might have difficulty meeting academic requirements and consequently might transfer to less selective colleges or drop out.	NSC, FSA, NCES-Barron's Admissions Competitiveness Index	1=Transferred from a more selective college (where enrolled Oct. 1, 2016) to a less selective college **or** dropped out by start of Year 2 (Oct. 1, 2017) 0 = Did not transfer from a more selective college to a less selective one or drop out by start of Year 2 (includes students who did not enroll in college initially after high school)	0.0	0.0	0.0

[a] Domains are provided for confirmatory measures and are taken from the WWC review protocol for studies of interventions to support postsecondary success version 4.0, downloaded from https://ies.ed.gov/ncee/wwc/Docs/ReferenceResources/WWC_supporting_postsecondary_success_protocol_4.0_08-01-19_sxf.pdf. NA indicates that there is no relevant domain for these outcomes in any of the WWC review protocols. As these outcomes were designated exploratory and the study was not planning on doing any adjustments for multiple hypothesis testing a domain was not named.

[b] As of 2014, Barron's six selectivity rankings for four-year colleges were *most competitive, highly competitive, very competitive, competitive, somewhat competitive,* and *noncompetitive,* plus *specialty/missing* (not ranked). For this study, unranked four-year colleges were combined with *noncompetitive* colleges and considered more selective than two-year colleges but less selective than four-year colleges ranked as *somewhat competitive*. The study considered two-year colleges the least competitive institution type.

Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018.

Measures of Other College Characteristics

The study also examined other characteristics of colleges that students attended to determine whether *Find the Fit* shifted the types of colleges that students attended in ways that might be positive for students or might bring unintended negative consequences. The characteristics are (1) college entrance exam scores of incoming freshmen, (2) graduation rate, (3) sticker price, (4) net price, and (5) distance from home.

Because the *Find the Fit* did not have an impact on college enrollment and to ease interpretation of the results, the analyses for these five college characteristics include only students who attended college in fall 2016. Including students who did not enroll in college in these analyses would depress the means or percentages, making the data difficult to interpret. For example, including students who did not enroll in college in the measure of distance from home would reduce the average miles. As a result, these analyses fall outside of the lottery framework, because they exclude students who did not enroll in college. Section B.4.2 documents baseline equivalence for the samples used to analyze differences in the characteristics of the colleges attended by students in *Find the Fit* projects versus regular UB advising projects for these measures because we are outside the study's lottery framework.

Exhibit B.10 below provides information on how each measure was constructed, as well as the rate of missing data for each among students who were enrolled in college. Missing data occurred because some colleges did not report data on some characteristics in IPEDS.

Exhibit B.10 Construction of Measures of College Characteristics and Percentage of Students Missing Data

College Characteristic	Rationale	Data Source	Construction	Percentage of Students Missing Data – Sample Enrolled in College: *Find the Fit* Group	Regular UB Advising Group	Overall
College entrance exam scores of incoming freshmen	**Exploratory measure**. The academic qualifications of students who choose to attend a given college, may affect the college's level of instruction, a measure of quality.	NSC, FSA, College Board	75th percentile of SAT scores for first-time, degree-seeking students at the college the student attended the first year after high school (Oct. 1, 2016)[a]	30.4	39.6	34.8
Graduation rate	**Exploratory measure**. A college's graduation rate provides another partial measure of quality because it reflects the instruction and supports provided by the college to help students graduate while also reflecting the characteristics of students who attend the college.	NSC, FSA, IPEDS	Percentage of first-time, full-time, degree-seeking students who graduated within 150 percent of "normal" time to completion[b] at the college the student attended the first year after high school (Oct. 1, 2016)	0.1	0.3	0.2
Sticker price	**Exploratory measure**. The study also examined college costs since a potential negative consequence of attending more selective colleges could be higher costs. More selective colleges typically have a higher average posted cost (sometimes called "sticker price") than less selective colleges do.	NSC, FSA, IPEDS	Posted cost of attendance, including tuition, fees, books, supplies, and living expenses, at the college the student attended the first year after high school (Oct. 1, 2016)[c]	0.7	0.4	0.3

College Characteristic	Rationale	Data Source	Construction	Percentage of Students Missing Data – Sample Enrolled in College		
				***Find the Fit* Group**	**Regular UB Advising Group**	**Overall**
Net price	**<u>Exploratory measure.</u>** More selective colleges often have more resources and are able to keep students' costs down by making grants and scholarships available to low-income students such as those in Upward Bound. As a result, college selectivity does not necessarily correspond to higher out-of-pocket costs, or "net price."	NSC, FSA, IPEDS	Average annual cost of attendance for students with household incomes of $30,000 or less after taking into account scholarships and grants at the college the student attended the first year after high school (Oct. 1, 2016)[d]	0.1	0.3	0.2
Distance from home	**<u>Exploratory measure</u>**. Because local and familiar colleges are often the default for low-income and first-generation college students, *Find the Fit* encouraged students to consider attending less-familiar colleges. One way the study measured this was as the average distance of students' college from the Upward Bound host institution, because students' home addresses were not available.	NSC, FSA, APRs	Miles between the college the student attended the first year after high school (Oct. 1, 2016) and the student's Upward Bound host institution	0.0	0.1	<0.1

a SAT verbal and math scores were summed. This characteristic has more missing data than the other college characteristics because most two-year colleges do not require students to submit standardized test scores, and some four-year colleges–particularly specialty schools and noncompetitive colleges–also do not require standardized test scores.
b "Normal" time to completion is within six years of enrollment at four-year institutions or within three years of enrollment at two-year institutions.
c This is the posted cost of attendance for the full academic year for first-time, full-time students. In-state or out-of-state tuition was used depending on whether or not the student attended a college in the same state as his/her Upward Bound host institution.
d This is the average annual cost for first-time, full-time in-state students who receive federal financial aid and have household incomes of $30,000 or less.
Sample Size: Find the Fit group = 1,683 students enrolled in college, Regular UB advising group = 1,516 students enrolled in college.
Source: IPEDS 2015-16.

Additional Information about Measuring College Enrollment

All of the measures in this report require first determining whether students attended college during the fall semester after high school, and if so, where they attended college. There were three potential sources of college enrollment data for this study—the National Student Clearinghouse (NSC); federal Financial Student Aid data (FSA); and Upward Bound Annual Performance Reports (APR) data, which are submitted by each Upward Bound project to the Department of Education and contained at least some data for every student who entered the UB projects.

Each of these data source covers overlapping, yet slightly different, groups of students. How and from where data are collected and released account for some of the differences in whether students appear as enrolled across the three sources. Specifically, student coverage, the matching algorithms, and the time period covered likely account for most differences (Exhibit B.11). Incomplete college coverage likely accounts for a very small amount of the discrepancies across the NSC and FSA data because the majority of students in the United States are enrolled in colleges that both participate in the NSC and accept federal financial aid funds.

Exhibit B.11 Comparison of College Enrollment Data Sources on Key Features

Feature	NSC	FSA	APR
Restricted to particular colleges	YES Colleges sign up to provide data to NSC (3,636 postsecondary institutions participate[a])	YES Only colleges that accept federal financial aid funds—that is, Title IV institutions (approximately 6,502 institutions[b])	NO Any college could be listed
Excludes certain students	YES Only students from participating colleges (97.8% of students enrolled in U.S. colleges covered[c])	YES Only records for students receiving federal financial aid	YES Only Upward Bound students are included
Students can prohibit the release of their information	YES NSC suppresses data when students request that their data be blocked under FERPA[d]	NO Student records are not suppressed	NO Student records are not suppressed
Matching process is based on SSN	NO Primarily student name and date of birth[e]	YES Primarily student SSN	NO All Upward Bound students are included
Reporting is based on a 12-month academic period	YES Specific enrollment dates allow for adjustable enrollment periods	YES Specific date that aid was dispensed allows for adjustable enrollment periods	NO 18 months after expected high school graduation

SSN is Social Security number.
[a] National Student Clearinghouse 2021.
[b] In 2017-18, a total of 6,502 Title IV two-year and four-year institutions in the United States and other U.S jurisdictions participated in Integrated Postsecondary Education Data System data collection; https://nces.ed.gov/programs/digest/d19/tables/dt19_105.50.asp
[c] National Student Clearinghouse 2020.
[d] The NSC reports that, on average, 4 percent of students block the release of their records, but block rates vary across states and are highest among students enrolled in two-year colleges (National Student Clearinghouse Research Center 2017).
[e] Though the wrong student could be linked with a given record in the NSC data, researchers have found that the NSC matching algorithm tends to result in more errors where no link is made than where the wrong student is linked. That is, research suggests students are more likely to not be found than to be mistaken for another person (Dynarski, Hemelt, and Hyman 2015).

Because no single source maintains college enrollment records for all students, reliance on any one source is likely to underestimate college enrollment. To determine the most useful source or sources to measure college enrollment, the study collected and analyzed enrollment data for an earlier cohort of Upward Bound students who were expected to graduate high school in 2011. These historical enrollment data allowed the study to examine the common and distinct features of each data source and assess the feasibility of combining information from multiple sources.

Each source–NSC, FSA, and Upward Bound APRs–produces a different initial college enrollment rate (defined as enrolled on October 1 in the fall after high school graduation) for the 25,992 Upward Bound students expected to graduate in 2011 (the "2011 cohort") (Exhibit B.12). The NSC is the most common data source for measuring enrollment; using only its records yielded a college enrollment rate for the 2011 cohort of 62 percent. Using only the FSA data yielded an enrollment rate of 65 percent. Relying solely on the APR data resulted in a 78 percent enrollment rate. Combining data from the NSC and the FSA yielded a college enrollment rate of 75 percent, whereas combining data from all three sources yielded a college enrollment rate of 82 percent.

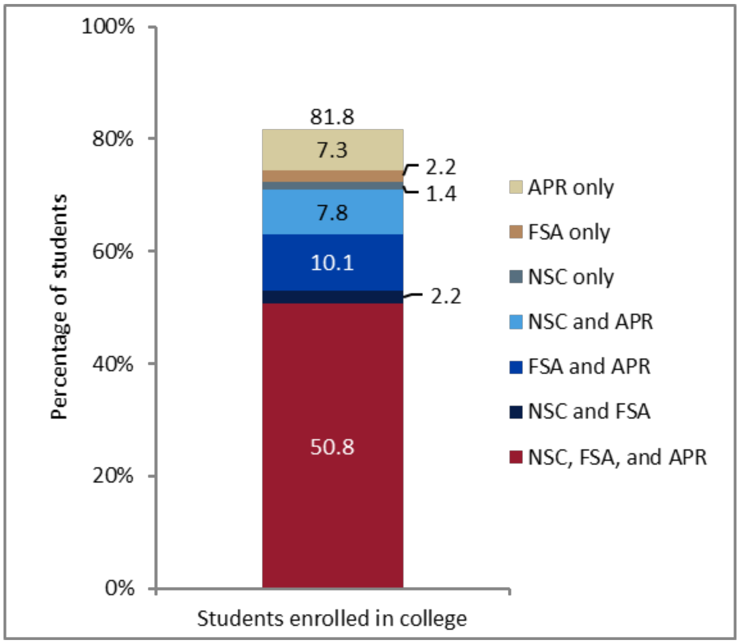
Exhibit B.12 College Enrollment Rates by Data Source

Data Source	Students Enrolled (%)
NSC only	62.2
FSA only	65.2
APR only	78.4
NSC and FSA	74.5
NSC, FSA, and APR	81.8

Notes: NSC and FSA college enrollment range is July 1, 2011, to June 30, 2012 (12 months).
APR college enrollment range is June 1, 2011, to December 1, 2012 (18 months).
Sample Sizes:
NSC: N = 25,992, Missing = 0.
FSA: N = 25,992, Missing = 0.
APR: N = 25,213, Missing = 779 students whose enrollment was not recorded in the APR data.
Source: FSA 2016; NSC 2016; APR 2012.

Exhibit B.13 below shows that, although the majority of students (51 percent) were reported as enrolled in all three datasets, some students were captured in only one or two of the datasets. Using any source alone would underestimate the college enrollment rate.

Exhibit B.13 Overlap in College Enrollment across Data Sources



Notes: NSC and FSA college enrollment range is July 1, 2011, to June 30, 2012 (12 months). APR college enrollment range is June 1, 2011, to December 1, 2012 (18 months).
Sample Size: 25,992 students.
Source: FSA 2016; NSC 2016; APR 2012.

For this study, college enrollment data were first obtained from the NSC. However, there are some limitations in using only the NSC data to examine college enrollment that may result in an undercount of students enrolled:

- **Missing colleges**. Some colleges do not provide student enrollment data to the NSC. About half of the postsecondary institutions that accept federal financial aid funding participate in the NSC (just over 3,600 of about 6,500 institutions). However, while the NSC does not cover all postsecondary institutions, it does cover institutions that enroll most college students. The institutions that participate in NSC enroll 97.8 percent of all students enrolled in postsecondary institutions.[19]
- **Missing students**. Even students enrolled at postsecondary institutions that participate in the NSC might not be included in the NSC, and these unreported enrollments are indistinguishable from non-enrollments. Colleges that provide records to NSC can opt to not share records for non-degree-seeking students, such as those in training programs.[20] In addition, under the Family Educational Rights and Privacy Act (FERPA), individual students can opt out of reporting their information for research purposes,[21] leading to incomplete coverage in student-level NSC data. Finally, some colleges do not provide NSC with the records of students who do not have a Social Security number, including undocumented and international students.[22]

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19 NSC (2020)

20 NSC encourages institutions to include non-degree-seeking students, but institutions could have different reporting policies. See www.studentclearinghouse.org/colleges/enrollment-reporting/faqs/.

21 NSC (2017) estimates that about 4 percent of students block their records, and approximately 4 percent of students in the study sample were blocked by the school or student.

22 Precise records about the number of students affected by this policy are not available.

- **Matching errors.** NSC matches students' college records based on name and birthdate,[23] and there could be a small amount of error in this matching process.[24]

If *Find the Fit* encouraged students to enroll in college or to enroll in different types of colleges, particularly those not participating in the NSC, then not having complete college enrollment data for some students could potentially bias the estimated effects of *Find the Fit*. For this reason, the study used FSA data and explored the possibility of using the Upward Bound APRs to increase the accuracy of the college enrollment measures.

FSA data cover students who receive federal financial aid,[25] which most Upward Bound students are expected to be eligible for because most are from low-income households.[26] FSA data cover the same time period as the study's enrollment outcomes. The study treated disbursement of financial aid funds on behalf of a student as an alternative indicator of college enrollment. Students who did not have a record of college enrollment from either the NSC or FSA were assumed to not be enrolled in college.

The APR data are submitted by each Upward Bound project to the Department of Education and contained at least some data for every student who entered the UB projects. However, "college enrollment" in the APR is defined over an 18-month period (June 1, 2011, to December 1, 2012), spanning two academic years, and is coded as 'yes' or 'no' without any specified date range of enrollment. This time period does not align with this study's enrollment outcomes, which were defined as "immediate enrollment" (as of October 1), "first-year enrollment" (July 1 to June 30), and so on. Further, UB projects are encouraged to use the NSC data for their APR reporting, so this data source might not contribute additional information beyond those data identified in the NSC. For these reasons and those discussed below, APR data were not used in this study's measure of college enrollment.

Additional Information about Measuring College Academic Undermatch

The study defines college academic "undermatch" as a student not attending college or attending a college that is less selective than those at which the student would have a 90 percent probability of admission.[27] Students not enrolled in college are included in the undermatch definition because all high school seniors could be admitted to at least a two-year college.

The study's calculation of undermatch consists of the following steps:

1. Classify each college by selectivity level.
2. Estimate a statistical (regression) model of acceptance to colleges at different selectivity levels.
3. Predict the probability of acceptance into each selectivity level for each Upward Bound student in the study.
4. Determine the highest selectivity level to which each student likely could be admitted—that is, for which the student is a good match.
5. Identify the selectivity level of the college that each Upward Bound student attended.

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23 NSC uses a logic path to match student records and then verifies matches by weighted node: https://www.studentclearinghouse.org/colleges/studenttracker/faqs/.

24 Using Michigan data, Dynarski, Hemelt, and Hyman (2015) found that the NSC matching algorithm did not add appreciable measurement error to identifying students. NSC reports having a match rate that is approximately 94 percent accurate, accounting for the 2.4 percent of student enrollment files for institutions that are not participating with NSC and approximately 3.6 percent matching errors. According to NSC, matching errors can be caused by a number of factors, including duplicate student records, missing Social Security numbers, and enrollment reporting submission errors. https://www.studentclearinghouse.org/colleges/studenttracker/faqs/.

25 FSA provides financial aid to more than 11 million students each year (U.S. Department of Education, n.d.). Among first-time, full-time degree- or certificate-seeking students, 85 percent of students at four-year colleges and 78 percent of students at two-year colleges received financial aid in 2013-14 (Kena et al. 2016).

26 According to Upward Bound Annual Performance Reports, 87.6 percent of the students in the study were from low-income households.

27 The report's undermatch outcome includes all students except those who attended four-year colleges that (a) are specialty schools, such as art schools, as identified by Barron's; (b) are not rated by Barron's; or (c) could not be directly linked to Barron's, such as four-year branch campuses that were not included in Barron's. The study could not assess whether students who attended these types of four-year colleges were or were not undermatched. When assessing the selectivity level of the college the student attended, the study coded students who attended these types of four-year colleges as attending any four-year college but not as attending colleges of selectivity levels above that level. Thus, there was no missing data for the selectivity outcome.

6. Compare the selectivity of the college the student attended with the highest selectivity level to which the student was a "good match."

Details of the study's approach used to calculate undermatch are as follows:[28]

Step 1: Classify each college by selectivity level

The 2014 NCES-Barron's Admissions Competitiveness Index was used to divide colleges into selectivity levels. Two adaptations were made to the Barron's rankings: (1) its top two rankings (*most competitive* and *highly competitive*) were collapsed into one level, and (2) *two-year and less-than-two-year* was added as the lowest selectivity level (Barron's ranks only four-year colleges).[29] Four-year institutions that Barron's did not rank, such as art schools, were excluded from the study's undermatch analysis.

These adaptations resulted in the following six selectivity levels:

- Most or Highly Competitive
- Very Competitive
- Competitive
- Somewhat Competitive
- Other Four-Year College
- Two-Year or Less-Than-Two-Year College

Step 2: Estimate a statistical (regression) model of acceptance to colleges at different selectivity levels

Next, a statistical model was estimated using a nationally representative sample of 14,015 high school seniors (2003-04 seniors from the Education Longitudinal Study of 2002, or ELS:2002) to predict students' probability of acceptance to colleges of different selectivity levels based on their high school academic credentials.[30]

The model links the colleges that students applied to[31] with the six selectivity levels from Step 1 using institution codes from IPEDS. More specifically, these selectivity levels are matched to the colleges to which ELS students applied and the colleges to which they were accepted. For each of the six selectivity levels, a student then is considered to have applied to that level if he/she applied to one or more colleges with that selectivity rating, regardless of the number of colleges in that selectivity level to which the student applied. Likewise, a student is considered to have been accepted to a selectivity level if the student applied and was accepted to one or more colleges with that selectivity rating, regardless of the number of colleges in that selectivity level to which the student was accepted.

For each selectivity level, a binary variable was created indicating whether a student was accepted to at least one college in that level. For example, the binary variable for the *very competitive* level was coded as 1 if a student was accepted to one or more *very competitive* colleges and 0 if not. The coding of one selectivity level was not affected by acceptance to other selectivity levels.

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28 This approach is similar to that used by Smith, Pender, and Howell (2013). However, unlike their analysis, this study's analysis does not collapse the *somewhat competitive* and *noncompetitive* (or "other four-year") levels of four-year colleges because Upward Bound students are more likely to attend less selective colleges than are U.S. high school students overall (authors' comparison of data from Seftor, Mamun, and Schirm [2009] on Upward Bound students' college enrollment versus data from Schmitt [2015] on national patterns of college enrollment). Additionally, students' unweighted GPA was used instead of their weighted GPA because the weighted GPA was not available for students in the study sample.

29 *Two-year or less-than-two-year* was included as one of the selectivity levels because approximately 25 percent of Upward Bound students in a prior study attended such colleges (Seftor, Mamun, and Schirm 2009).

30 The ELS sample used in this analysis is restricted to students who were seniors in spring 2004, who applied to colleges, and for whom acceptance decisions are known.

31 The ELS collected data on the number of colleges to which a student applied, the name of each college, and the applicant's acceptance status at each. Students applied to between zero and 18 colleges. About 17 percent of students did not apply to any college, 51 percent applied to one or two colleges, and 32 percent applied to three or more colleges.

The model predicting college acceptance included only measures of students' academic credentials that were available in both the ELS data and the Upward Bound APR data, plus NSC, College Board, and ACT records. These characteristics were unweighted high school GPA; highest college entrance exam score (the SAT; the ACT converted to the SAT scale; or, if both the SAT and ACT were unavailable, the PSAT or PLAN), and whether the student had taken one or more Advanced Placement (AP) exams.[32] Students who were missing college entrance exam scores (32 percent of the sample, *n* = 4,497) were included using the dummy variable method (see Section B.4.2 for details on this method). An indicator for whether the SAT, ACT, or PSAT/PLAN score was used also was included in the model. Students in the ELS who were missing GPA (7 percent of the sample, *n* = 963) were excluded from the analysis because of the centrality of valid GPAs to the predictions.[33]

Analysis Model. Logistic regression was used to model the probability of acceptance to each of the six selectivity levels, conditional on the student having applied to a college at that selectivity level.[34] For example, only students who applied to *competitive* colleges were included in the analysis of the probability of acceptance to *competitive* colleges.

The model of the probability of acceptance for the K^{th} college selectivity level is conditional on application to that selectivity level, GPA, college entrance exam score, and AP test taking. It can be represented as:

$$\text{Prob}[\text{ACCEPT}_K = 1 \mid \text{APPLY}_K = 1, \text{GPA, EXAM SCORE, AP TESTTAKING}]$$

More specifically, the following equation is estimated for each of the $K = 6$ college selectivity levels. The equation includes higher-order terms to allow the effects of GPA and college entrance exam score to vary at different points on the distribution—for example, enabling the effect of GPA to be more pronounced for higher GPAs than for moderate GPAs. The model also includes an interaction between GPA and missing exam score to allow the effect of GPA to differ for students with a non-missing exam score versus students with a missing exam score.[35]

$$\text{Prob}[\text{ACCEPT}_K = 1] = \frac{1}{1 + e^{\substack{-(\beta_0+\beta_1\text{GPA}+\beta_2\text{GPA}-\text{SQ}+\beta_3\text{GPA}-\text{cubic}+\beta_4\text{Hi}-\text{SAT}-\text{ACT}-\text{PSAT}+\beta_5\text{EXAM}-\text{SQ}+\beta_6\text{TEST}-\text{cubic} \\ +\beta_7\text{ACT}-\text{SCORE}-\text{USED}+\beta_8\text{PSAT}-\text{SCORE}-\text{USED}+\beta_9\text{Missing}-\text{Score}-\text{Flag}+\beta_{10}\text{APEXAM} \\ +\beta_{11}\text{GPA}*\text{Missing}-\text{Score})}}}$$

Where,

β_0 is the covariate-adjusted log-odds of acceptance to a college of a given selectivity level for students who applied to a college in selectivity level *K*.

ACCEPT_K is a binary variable indicating acceptance into one or more colleges in selectivity level *K*.

APPLY_K is a binary variable indicating application to one or more colleges in selectivity level K.

GPA is the student's unweighted high school GPA.

GPA-SQ is the student's unweighted high school GPA squared (GPA*GPA).

GPA-cubic is the student's unweighted high school GPA cubed (GPA*GPA*GPA).

Hi_SAT_ACT_PSAT is the higher of the student's most recent SAT or ACT score converted to the SAT scale, or is the student's most recent PSAT score converted to the SAT scale if both the SAT and ACT score are unavailable, with missing values set to = 0.

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32 There were a few differences between how academic credentials were measured in the ELS data versus the Upward Bound data. If Upward Bound students did not have a SAT, ACT, or PSAT score, their PLAN score was used instead, if available. PLAN scores were not available in the ELS data. Similarly, the variable for Upward Bound was whether students took one or more AP or International Baccalaureate courses. In the ELS data, whether students took one or more AP exams was used.

33 For GPA, the dummy variable method to handling missing data was considered, but the approach resulted in estimation problems.

34 Modeling the probability of acceptance conditional on application follows Smith, Pender, and Howell's (2013) approach, although the study team acknowledges that there might be unobserved characteristics that affect both application and acceptance.

35 The final model used to predict the probability of acceptance for each college selectivity category includes higher-order terms for GPA and highest test score (SAT, ACT, or PSAT) and interactions. Based on a test of goodness-of-fit (differences in -2 log likelihood), we determined that the model with cubic terms for GPA and test score and with the interaction between GPA and missing test score provides superior fit compared to models without these terms.

TEST-SQ is the student's exam score squared.

TEST-cubic is the student's exam score cubed.

ACT_SCORE_USED is a binary variable indicating that either the student took only the ACT and not the SAT or the student took both exams and scored higher on the ACT than the SAT.

PSAT_SCORE_USED is a binary variable indicating the student took only the PSAT and not the ACT or SAT.

MISSIN _SCORE_FLA is a binary variable indicating that the student's SAT, ACT, and PSAT scores are all missing.

APTEST is a binary variable indicating that the student took one or more AP tests.

GPA*Missing-Score is the product of GPA and the binary indicator for students with missing SAT, ACT, and PSAT scores. Values are 0 for students with an exam score, and values are GPA for students without an exam score.

The analysis is adjusted for the two-level, clustered sampling design (students clustered within schools) and non-response, using sampling and non-response weights.

Step 3: Predict the probability of acceptance into each selectivity level for each Upward Bound student in the study

Next, the study used the model described above to predict the probability of Upward Bound students' acceptance to colleges at different selectivity levels. Using the parameter estimates generated from the ELS sample (in Step 2) for each selectivity level and each Upward Bound student's academic credentials, the study estimated the probability of a student being accepted to colleges in each of the selectivity levels.

Step 4: Determine the highest selectivity level to which each student likely could be admitted—that is, for which the student is a good match

Next, the study defined the highest selectivity level to which each student likely would have access, following the approach used by Smith and his coauthors.[36] This approach defines the highest selectivity level to which a student has at least a 90 percent probability of acceptance, conditional on applying (to that selectivity level).[37]

In rare cases, students could have a greater than 90 percent conditional probability of being accepted to a given selectivity level but a less than 90 percent chance of being accepted to a lower selectivity level(s). In such cases, students were classified as having access to the lowest level that was less than 90 percent.[38]

Step 5: Identify the selectivity level of the college that each Upward Bound student attended

To identify the colleges that students attended in fall 2016, the study linked Upward Bound students to data on college attendance from the NSC and FSA. The study defined students as attending college if either the NSC or FSA data recorded them as enrolled on October 1, 2016. If a student was enrolled in multiple colleges on October 1, full-time enrollment superseded part-time enrollment. (More details on how the study measured college enrollment are provided in the prior section.)

The NSC and FSA data include Office of Postsecondary Education college codes, which were then linked to the 2015-16 IPEDS institution codes. The student's college was then matched to the 2014 NCES-Barron's data by the IPEDS institution code, to determine the college's selectivity level.

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[36] Smith, Pender, and Howell (2013).

[37] This is also the threshold used by Roderick et al. (2008) to define the highest selectivity level to which students have access.

[38] This is consistent with the approach taken by Smith, Pender, and Howell (2013).

Step 6: Compare the selectivity of the college the student attended with the highest selectivity level to which the student was a "good match"

For each student, the study compared the selectivity of the college where the student enrolled versus the highest selectivity level to which the student was predicted to have at least a 90 percent conditional probability of acceptance. If the student enrolled in a college at or above the highest predicted selectivity level of access, the student was classified as *matched*. If the student enrolled at a lower level, or did not enroll in college at all, the student was classified as *undermatched*.

Measures Describing Students and Projects

The study uses characteristics measured before the lottery (at baseline) to describe Upward Bound projects and students. Data for most student characteristics come from the 2015 APRs, which as described previously, were submitted by each Upward Bound project to the Department of Education and contained data for almost every student who entered the projects.[39] Data were available for more than 98 percent of the study sample in the APR. When missing from the APR, data on student gender, race/ethnicity, and "first generation to college" status were taken from the survey that students completed prior to the lottery. For students' college entrance exam scores, students' highest score on the SAT or ACT through spring 2015 was used (or their PSAT or PLAN score[40] was substituted if SAT and ACT scores were not available).

Fortunately, information about student characteristics from the APR and the baseline student survey were very well aligned, making the survey a good alternative source for filling in missing data as needed. Exhibit B.14 shows the congruence of data from the two sources when data were available in both sources. For measures available in both the APR and baseline student survey, the data matched for 89 to 98 percent of students.

Exhibit B.14 Congruence between Annual Performance Report and Baseline Student Survey Data

	Percentage of Students Missing Data				
Measure	APR	Baseline Survey	Both	Number of Students in Both Sources	Percentage Congruent
Gender	1.0	23.1	0.5	3,395	98.3
Race/ethnicity	2.2	23.8	0.7	3,320	93.7
First generation to college	1.0	33.6	0.6	2,932	88.5

Notes: Only students with non-missing values in both the APR and baseline student survey are used to calculate the percentage congruent between the two data sources.
Sample Size: For percentage missing = 4,443 students.
Source: APR 2014-15; baseline student survey 2015.

[39] The APR data was the preferred source of data for most of the baseline student characteristics rather than the baseline student survey because the APR had more complete data for the study sample. Data were missing for at least 20 percent of the sample in the baseline student survey data, compared to less than 2 percent missing data in the APR.

[40] Students' college entrance exam scores were collected when students in the study sample were in the 10th or 11th grade; as a result, some students had only PSAT or PLAN scores available. These tests are strong predictors of performance on the SAT and can be converted to a predicted SAT score using the conversion tables provided by the College Board.

Exhibit B.15 below shows the definition of each student characteristic, its data source, and the percentage of students missing data. In addition, the exhibit shows the same information for the Upward Bound project characteristics—host institution type, locale, and project historical college enrollment rate.

Some of the student characteristics listed in Exhibit B.15 are also used as covariates in the statistical models examining the effects of *Find the Fit* to take into account possible existing differences between students in the *Find the Fit* and regular UB advising group projects and to improve the precision of the impact estimates.[41] The analytic models also account for host institution type and locale via the randomization blocks discussed in Section B.4 and include projects' historical college enrollment rate as an additional project-level baseline measure.

[41] Each analysis model included one of the two following student characteristics: (a) whether the student planned to apply to college as of the spring of her/his junior year or (b) whether the student would be undermatched at the highest selectivity college to which she/he planned to apply as of the spring of her/his junior year. Specifically, whether the student would be undermatched based on the colleges she/he planned to apply to at baseline was included as a covariate in the models estimating impacts on undermatch and the alternative measures of college quality, while whether the student was planning to apply to college was included as a covariate in the remaining models.

Exhibit B.15 Student and Project Characteristics Before the Lottery: Construction and Missing Data

Measure	Data Source	Coding	Percentage of Students Missing Data		
			Find the Fit Group	Regular UB Advising Group	Overall
Student Characteristic					
Gender	APR; baseline student survey	1 = Female 0 = Male	0.8	0.2	0.5
Race/ethnicity	APR; baseline student survey	Four categories: 1 = Hispanic 2 = White, non-Hispanic 3 = Black, non-Hispanic 4 = Other/multiracial, non-Hispanic	1.1	0.4	0.7
Low-income household	APR	1= Upward Bound eligibility criteria indicate that household is low income 0 = Upward Bound eligibility criteria do not indicate that household is low income	1.1	0.9	1.0
First generation to college	APR; baseline student survey	1 = No parent in the household received a bachelor's degree 0 = At least one parent in the household received a bachelor's degree	0.8	0.3	0.6
Completed AP/IB course	APR	1 = Completed an AP or IB course or both 0 = Has not completed an AP or IB course	1.3	1.0	1.2
GPA	APR	Unweighted grade point average	15.7	12.0	13.9
College entrance exam score	College Board (SAT) or ACT	Highest score on SAT or ACT, or PSAT or PLAN if no SAT or ACT score available; all scores converted to SAT scale	25.3	28.9	27.0
Planned to apply to college	Baseline student survey	1 = Student reported planning to apply to college 0 = Student did not report planning to apply to college	19.4	19.3	19.4
Undermatched at all colleges where planned to apply	Baseline student survey	1 = Student would be undermatched at the highest selectivity college where planning to apply, or student did not report planning to apply to college 0 = Student would not be undermatched at the highest selectivity college where planning to apply	21.2	20.8	21.0

Measure	Data Source	Coding	Percentage of Students Missing Data		
			Find the Fit Group	Regular UB Advising Group	Overall
Project Characteristic					
Host institution type	IPEDS	Three categories: 3 = Four-year college 2 = Two-year college 1 = Other	0.0	0.0	0.0
Locale	IPEDS	Four categories: 1 = City 2 = Suburb 3 = Town 4 = Rural	0.0	0.0	0.0
Project historical college enrollment rate	APR	Project's reported rate of college enrollment for 2012-13 high school graduates	5.1	3.1	4.1

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.

Sample Sizes:

Student characteristics: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.

Project characteristics: *Find the Fit* group = 98 projects, Regular UB advising group = 96 projects.

Source: APR 2012-13 and 2014-15; baseline student survey 2015; college entrance exam score data 2015; IPEDS 2015-16.

Several of the baseline characteristics described above were also used in exploratory analyses to examine the effectiveness of *Find the Fit* for subgroups of students or projects. The study included five subgroups that were of policy interest and for which there was existing research suggesting that enhanced advising such as *Find the Fit* might have different impacts. For example, prior research suggests that some types of students are likely to have higher rates of college undermatch or face greater challenges in attending more selective, higher-quality institutions. Exposure to *Find the Fit* could affect such students differently than students with fewer challenges. Understanding impacts on these particular subgroups could be useful for targeting technical assistance or other aspects of program improvement. Exhibit B.16 shows these subgroups and the rationale for examining each group.

Exhibit B.16 Rationale for Exploring Effects for Subgroups of Students and Projects

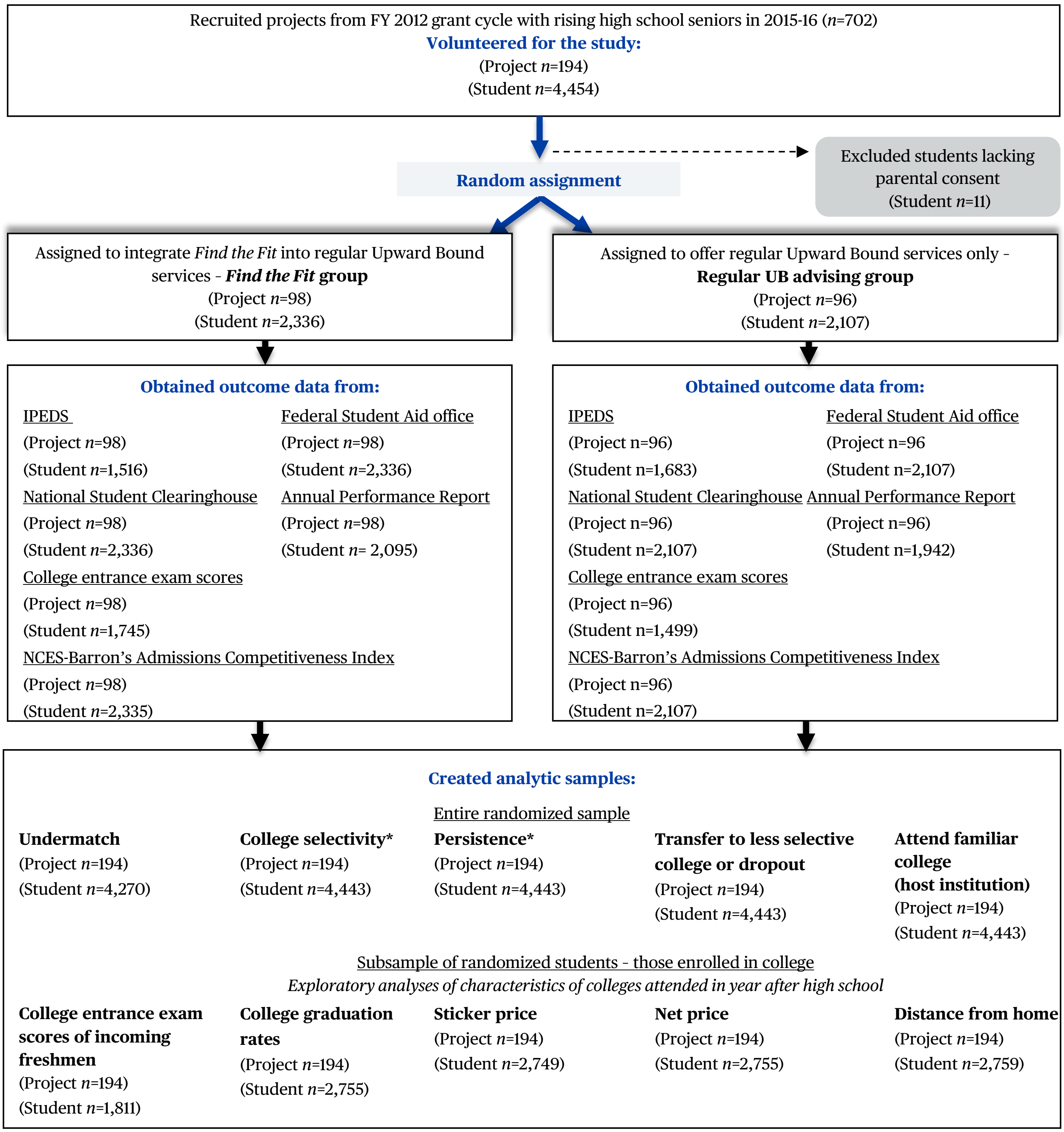
Subgroup	Rationale	Number (Percentage) of Study Students by Subgroup Category
Student Characteristic		
Gender	Male students are more likely to undermatch than female students[a] and their college enrollment rates are lower.[b] Thus, identifying strategies that improve male students' enrollment is of particular policy interest.	Male: 1,592 (36.0%) Female: 2,828 (64.0%)
Race/ethnicity	Students' race/ethnicity is related to their probability of undermatch. For example, controlling for other factors, Black students are less likely to undermatch than are other students.[c] Hispanic students are particularly likely to attend local colleges,[d] potentially creating a barrier to reducing undermatch.	Hispanic: 1,139 (25.8%) White, non-Hispanic: 1,031 (23.4%) Black, non-Hispanic: 1,704 (38.6%) Other: 536 (12.2%)
College entrance exam score[e]	Many colleges use SAT and ACT exam scores as a factor for admission and a proxy for academic preparation in high school. Given that some approaches to address undermatch have focused exclusively on students with high academic qualifications,[f] one purpose of this study is to understand whether undermatch can be ameliorated for students with varying levels of academic qualifications.	Highest quartile: 218 (4.9%) Second quartile: 533 (12.0%) Third quartile: 826 (18.6%) Lowest quartile: 1,667 (37.5%) Missing score: 1,199 (27.0%)
Project Characteristic		
Rural host institution	Students in rural areas may have fewer colleges to choose from nearby, which may partly explain why students from rural areas are more likely to undermatch in their college choices.[f]	Rural: 461 (10.4%) Non-rural: 3,982 (89.6%)
Host institution type	The study's analysis of historical APR data found that students at Upward Bound projects hosted by two-year colleges enroll in their host institution at a higher rate than do students at projects hosted by four-year colleges.	Four-year college: 2,819 (63.4%) Two-year college: 1,069 (24.1%) Other: 555 (12.5%)

a Smith, Pender, and Howell (2013). The rate of undermatch for male students was 3 percentage points higher than for female students.
b Bailey and Dynarski (2011).
c Roderick, Coca, and Nagaoka (2011); Smith, Pender, and Howell (2013). The rate of undermatch for Black students was 9 percentage points lower than for white students and the rate of undermatch for Hispanic students was 5 percentage points lower than for white students
d Hurtado et al. (2008).
e For subgroup analyses based on students' college entrance exam scores, students' scores were coded into four categories based on quartiles from the nationally representative ELS:2002, providing a point of reference for these scores beyond the study sample. The quartiles were 1140-1600, 990-1130, 860-980, and 400-850.
f For example, Hoxby and Turner (2013).
g Smith, Pender, and Howell (2013).

B.4.2 Estimating the Effectiveness of *Find the Fit*

The study defined the "sample" as all participating Upward Bound projects and their rising 2015-16 seniors who participated in the lottery. This definition helped to ensure that the estimates reflected unbiased effects of *Find the Fit* on students. Exhibit B.17 below diagrams the flow of study participants from the recruited Upward Bound projects and students to the analytic study samples used to investigate the effectiveness of *Find the Fit* on each of the measures in this report.

Exhibit B.17 Flow from Recruitment of Upward Bound Projects to Study Samples
Sample Used for Analysis of the Effectiveness of Find the Fit



*Notes: Sample sizes are the same for each year (first, second, and third years after high school).

Random assignment by lottery created two groups–*Find the Fit*, regular UB advising–that were initially similar on characteristics related to college academic undermatch, selectivity, and persistence (Exhibits B.5 and B.6, above). Together, the two groups comprise the full randomized sample. However, some analyses focused on smaller groups of students, such as those who initially enrolled in college or those for whom academic undermatch could be calculated. For each analysis that did not use the full sample, the baseline characteristics of students in the two groups are compared to establish that the groups were similar before the lottery. Thus, any differences seen in college-going behaviors between the two groups could be attributed to *Find the Fit*.

College Academic Undermatch. The students in the *Find the Fit* and regular UB advising groups in the sample used to analyze the effectiveness of *Find the Fit* on college academic undermatch had similar characteristics before the lottery (Exhibit B.18).

Exhibit B.18 Characteristics of Students before the Lottery Used in the Analysis of Undermatch, by Group

Characteristic	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference	*p*-Value[a]	Effect Size[b]
Gender					
Female	64.4	64.5	-0.2	.921	-0.004
Race/Ethnicity					
Hispanic	26.9	21.9	5.0	.261	0.163
White, non-Hispanic	22.4	25.5	-3.0	.455	-0.101
Black, non-Hispanic	38.8	39.6	-0.9	.872	-0.022
Other, non-Hispanic	11.9	13.0	-1.1	.711	-0.061
Household Characteristic					
Low-income household	88.1	87.7	0.4	.782	0.021
First generation to college	91.1	92.4	-1.3	.266	-0.102
Academic Characteristic					
Taken one or more AP/IB courses	36.4	31.5	4.8	.194	0.131
Unweighted cumulative GPA (mean)	3.1	3.0	0.0	.576	0.039
College entrance exam (mean SAT score)	874.6	864.3	10.3	.396	0.061
Baseline Proxy					
Undermatched at all colleges where planned to apply	19.5	21.6	-2.2	.273	-0.080
Project historical college enrollment rate	84.0	86.2	-2.2	.273	-0.200
Overall Test of Baseline Difference					
F-test[c]			*p* = .657		

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.

a p-Values shown in this column are for tests of whether there was a statistically significant baseline difference in the characteristic indicated in the row.

b Effect sizes are calculated using the Hedges' G formula for continuous variables and the Cox Index for binary variables.

c p-Value shown in this row is for a test of whether the *Find the Fit* and regular UB advising groups statistically differed overall at baseline, across all characteristics shown in the table.

Notes: The *Find the Fit* group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects. See Exhibit B.15 for additional details on missing data for characteristics measured before the lottery. The unadjusted standard deviations for the *Find the Fit* and regular UB advising groups, respectively, were 0.6 and 0.7 for cumulative GPA and 164.2 and 172.0 for college entrance exam.

Sample Sizes:

Gender: *Find the Fit* group = 2,256 students, Regular UB advising group = 1,991 students.

Race/ethnicity: *Find the Fit* group = 2,249 students, Regular UB advising group = 1,988 students.

Low-income household: *Find the Fit* group = 2,248 students, Regular UB advising group = 1,978 students.

First generation to college: *Find the Fit* group = 2,255 students, Regular UB advising group = 1,990 students.

Taken AP/IB courses: *Find the Fit* group = 2,243 students, Regular UB advising group = 1,975 students.

GPA: *Find the Fit* group = 1,916 students, Regular UB advising group = 1,758 students.

College entrance exam: *Find the Fit* group = 1,710 students, Regular UB advising group = 1,423 students.

Undermatched at all colleges where planned to apply: *Find the Fit* = 1,793 students, Regular UB advising group = 1,586 students.
Project historical college enrollment rate: *Find the Fit* group = 2,257 students, Regular UB advising group = 1,962 students.
Source: APR 2012-13 to 2014-15; college entrance exam score data 2015; baseline student survey 2015.

College Entrance Exam Scores. The students in the *Find the Fit* and regular UB advising groups in the sample used to analyze the academic qualifications of incoming freshmen at the colleges attended had similar characteristics before the lottery (Exhibit B-19). The sample used for this analysis is smaller than the samples used for other analyses because most two-year colleges and some four-year colleges, particularly specialty schools and noncompetitive colleges, do not require students to submit standardized test scores.

Exhibit B.19 Characteristics of Students before the Lottery Used in the Analysis of College Entrance Exam Scores of Incoming Freshmen at College Attended, by Group

Characteristic	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference	*p*-Value[a]	Effect Size[b]
Gender					
Female	67.3	68.1	-0.8	.747	-0.023
Race/Ethnicity					
Hispanic	29.6	22.2	7.4	.134	0.235
White, non-Hispanic	17.6	22.5	-4.9	.267	-0.185
Black, non-Hispanic	39.4	40.3	-0.9	.877	-0.023
Other, non-Hispanic	13.3	14.9	-1.7	.610	-0.083
Household Characteristic					
Low-income household	87.0	86.1	0.9	.673	0.046
First generation to college	91.8	90.9	0.9	.583	0.072
Academic Characteristic					
Taken one or more AP/IB courses	51.6	47.1	4.5	.346	0.110
Unweighted cumulative GPA (mean)	3.3	3.3	-0.0	.448	-0.062
College entrance exam (mean SAT score)	927.2	924.3	2.9	.852	0.017
Baseline Proxy					
Undermatched at all colleges where planned to apply	15.0	17.1	-2.1	.377	-0.094
Project historical college enrollment rate	84.8	86.9	-2.1	.377	-0.214
Overall Test of Baseline Difference					
F- test[c]	$p = .511$				

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.
[a] *p*-Values shown in this column are for tests of whether there was a statistically significant baseline difference in the characteristic indicated in the row.
[b] Effect sizes are calculated using the Hedges' G formula for continuous variables and the Cox Index for binary variables.
[c] *p*-Value shown in this row is for a test of whether the *Find the Fit* and Regular UB advising groups statistically differed overall at baseline, across all characteristics shown in the table.
Notes: *Find the Fit* group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects. See Exhibit B.15 for additional details on missing baseline data. The unadjusted standard deviations for the *Find the Fit* and Regular UB advising groups, respectively, were 0.6 and 0.7 for cumulative GPA and 163.7 and 171.8 for college entrance exam.
Sample Sizes:
Gender: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
Race/ethnicity: *Find the Fit* group = 982 students, Regular UB advising group = 823 students.
Low-income household: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
First generation to college: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
Taken AP/IB course: *Find the Fit* group = 985 students, Regular UB advising group = 822 students.
GPA: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
College entrance exam score: *Find the Fit* group = 795 students, Regular UB advising group = 618 students.
Planned to apply to college: *Find the Fit* group = 827 students, Regular UB advising group = 692 students.
Project historical college enrollment rate: *Find the Fit* group = 981 students, Regular UB advising group = 817students.
Source: APR 2012-13 to 2014-15; college entrance exam score data 2015; baseline student survey 2015.

Graduation Rate. Similarly, the students in the *Find the Fit* and regular UB advising groups in the sample used to analyze the graduation rates of the colleges attended had similar characteristics before the lottery (Exhibit 20).

Exhibit B.20 Characteristics of Students before the Lottery Used in the Analysis of Graduation Rate at College Attended, by Group

Characteristic	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference	*p*-Value[a]	Effect Size[b]
Gender					
Female	65.5	66.2	-0.7	.739	-0.018
Race/Ethnicity					
Hispanic	28.8	24.1	4.7	.310	0.147
White, non-Hispanic	20.2	24.7	-4.5	.285	-0.157
Black, non-Hispanic	38.6	38.3	0.4	.950	0.009
Other, non-Hispanic	12.2	12.9	-0.7	.813	-0.039
Household Characteristic					
Low-income household	88.0	86.3	1.8	.287	0.095
First generation to college	91.8	91.9	-0.1	.942	-0.008
Academic Characteristic					
Taken one or more AP/IB courses	42.8	38.2	4.6	.279	0.115
Unweighted cumulative GPA (mean)	3.2	3.2	0.0	.899	0.009
College entrance exam (mean SAT score)	896.6	886.8	9.8	.478	0.057
Baseline Proxy					
Undermatched at all colleges where planned to apply	16.8	18.8	-2.0	.351	-0.084
Project historical college enrollment rate	84.2	86.3	-2.0	.351	-0.201
Overall Test of Baseline Difference					
F- test[c]	$p = .607$				

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant baseline difference in the characteristic indicated in the row.

[b] Effect sizes are calculated using the Hedges' G formula for continuous variables and the Cox Index for binary variables.

[c] *p*-Value shown in this row is for a test of whether the *Find the Fit* and Regular UB advising groups statistically differed overall at baseline, across all characteristics shown in the table.

Notes: *Find the Fit* group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects. See Exhibit B.15 for additional details on missing baseline data. The unadjusted standard deviations for the *Find the Fit* and Regular UB advising groups, respectively, were 0.6 and 0.6 for cumulative GPA and 164.3 and 177.9 for college entrance exam.

Sample Sizes:

- Gender: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- Race/ethnicity: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,330 students.
- Low-income household: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- First generation to college: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- Taken AP/IB course: *Find the Fit* group = 1,421 students, Regular UB advising group = 1,330 students.
- GPA: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- College entrance exam score: *Find the Fit* group = 1,098 students, Regular UB advising group = 976 students.
- Planned to apply to college: *Find the Fit* group = 1,177 students, Regular UB advising group = 1,096 students.
- Project historical college enrollment rate: *Find the Fit* group = 1,414 students, Regular UB advising group = 1,310 students.

Source: APR 2012-13 to 2014-15; college entrance exam score data 2015; baseline student survey 2015.

Sticker Price. In the sample used to analyze the sticker prices of the colleges that students attended, students in the *Find the Fit* and regular UB advising groups had similar characteristics before the lottery, except that students in *Find the Fit* projects were 2 percentage points more likely than their counterparts in regular UB advising projects to report that they planned to apply to college (Exhibit B.21). This difference could be expected by chance, given the number of characteristics examined. Even so, the difference was taken into account in the statistical model used to estimate the effect of *Find the Fit*. The difference (effect size = 0.20) is within the range the What Works Clearinghouse™ considers acceptable if the analysis models control for the difference.[42]

Exhibit B.21 Characteristics of Students before the Lottery Used in the Analysis of Sticker Price at College Attended, by Group

Characteristic	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference	*p*-Value[a]	Effect Size[b]
Gender					
Female	65.5	66.2	-0.7	.752	-0.018
Race/Ethnicity					
Hispanic	28.9	24.2	4.7	.309	0.147
White, non-Hispanic	20.2	24.8	-4.5	.282	-0.158
Black, non-Hispanic	38.6	38.2	0.4	.946	0.010
Other, non-Hispanic	12.2	12.9	-0.7	.812	-0.039
Household Characteristic					
Low-income household	88.0	86.3	1.6	.316	0.089
First generation to college	91.8	91.9	-0.1	.927	-0.010
Academic Characteristic					
Taken one or more AP/IB courses	42.8	38.3	4.5	.281	0.114
Unweighted cumulative GPA (mean)	3.2	3.2	0.0	.899	0.009
College entrance exam (mean SAT score)	896.6	886.7	9.9	.471	0.058
Baseline Proxy					
Planned to apply to college	92.9	90.5	2.4	.043	0.195
Project historical college enrollment rate	84.2	86.3	-2.0	.355	-0.200
Overall Test of Baseline Difference					
F-test[c]			*p* = .622		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant baseline difference in the characteristic indicated in the row.
[b] Effect sizes are calculated using the Hedges' G formula for continuous variables and the Cox Index for binary variables. [c] *p*-Value shown in this row is for a test of whether the *Find the Fit* and Regular UB advising groups statistically differed overall at baseline, across all characteristics shown in the table.
AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.
Notes: *Find the Fit* group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects See Exhibit B.15 for additional details on missing baseline data. The unadjusted standard deviations for the *Find the Fit* and Regular UB advising groups, respectively, were 0.6 and 0.6 for cumulative GPA and 164.4 and 178.0 for college entrance exam.
Sample Sizes:
Gender: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
Race/ethnicity: *Find the Fit* group = 1,414 students, Regular UB advising group = 1,328 students.
Low-income household: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
First generation to college: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
Taken AP/IB course: *Find the Fit* group = 1,417 students, Regular UB advising group = 1,328 students.
GPA: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
College entrance exam score: *Find the Fit* group = 1,095 students, Regular UB advising group = 975 students.
Planned to apply to college: *Find the Fit* group = 1,201 students, Regular UB advising group = 1,116 students.
Project historical college enrollment rate: *Find the Fit* t group = 1,410 students, Regular UB advising group = 1,308 students.
Source: APR 2012-13 to 2014-15; college entrance exam score data 2015; baseline student survey 2015.

Net Price. In the sample used to analyze the net price of the colleges that students attended, students in the *Find the Fit* and regular UB advising groups had similar characteristics before the lottery, except that students in *Find*

[42] The What Works Clearinghouse™ considers this an acceptable way to establish baseline equivalence on characteristics with a mean difference between the treatment and control group that is less than .25 standard deviations, which is the case for all baseline characteristics measured in this study.

the Fit projects were 2 percentage points more likely than students in regular UB advising projects to report that they planned to apply to college (Exhibit B.22). Again, this difference (effect size = 0.20) could be expected by chance, given the number of characteristics examined, and the difference was taken into account in the statistical model used to estimate the effect of *Find the Fit*.

Exhibit B.22 Characteristics of Students before the Lottery Used in the Analysis of Net Price at College Attended, by Group

Characteristic	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference	*p*-Value[a]	Effect Size[b]
Gender					
Female	65.5	66.2	-0.7	.739	-0.018
Race/Ethnicity					
Hispanic	28.8	24.1	4.7	.310	0.147
White, non-Hispanic	20.2	24.7	-4.5	.285	-0.157
Black, non-Hispanic	38.6	38.3	0.4	.950	0.009
Other, non-Hispanic	12.2	12.9	-0.7	.813	-0.039
Household Characteristic					
Low-income household	88.0	86.3	1.8	.287	0.095
First generation to college	91.8	91.9	-0.1	.942	-0.008
Academic Characteristic					
Taken one or more AP/IB courses	42.8	38.2	4.6	.279	0.115
Unweighted cumulative GPA (mean)	3.2	3.2	0.0	.899	0.009
College entrance exam (mean SAT score)	896.6	886.8	9.8	.478	0.057
Baseline Proxy					
Planned to apply to college	92.9	90.5	2.4	.042	0.195
Project historical college enrollment rate	84.2	86.3	-2.0	.351	-0.201
Overall Test of Baseline Difference					
F-test[b]			$p = .607$		

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant baseline difference in the characteristic indicated in the row.

[b] Effect sizes are calculated using the Hedges' G formula for continuous variables and the Cox Index for binary variables. [c] *p*-Value shown in this row is for a test of whether the *Find the Fit* and Regular UB advising groups statistically differed overall at baseline, across all characteristics shown in the table.

Notes: *Find the Fit* group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects. See Exhibit B.15 for additional details on missing baseline data. The unadjusted standard deviations for the *Find the Fit* and Regular UB advising groups, respectively, were 0.6 and 0.6 for cumulative GPA and 164.3 and 177.9 for college entrance exam.

Sample Sizes:

- Gender: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- Race/ethnicity: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,330 students.
- Low-income household: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- First generation to college: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- Taken AP/IB course: *Find the Fit* group = 1,421 students, Regular UB advising group = 1,330 students.
- GPA: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
- College entrance exam score: *Find the Fit* group = 1,098 students, Regular UB advising group = 976 students.
- Planned to apply to college: *Find the Fit* group = 1,203 students, Regular UB advising group = 1,117 students.
- Project historical college enrollment rate: *Find the Fit* group = 1,414 students, Regular UB advising group = 1,310 students.

Source: APR 2012-13 to 2014-15; college entrance exam score data 2015; baseline student survey 2015.

Distance from Home. In the sample used to analyze the distance from home of the colleges that students attended, students in the *Find the Fit* and regular UB advising groups had similar characteristics before the lottery, except that students in *Find the Fit* projects were 2 percentage points more likely than students in regular UB advising projects to report at baseline that they planned to apply to college (Exhibit B.23). This difference (effect size = 0.19) is within the range the What Works Clearinghouse™ considers acceptable if the analysis models control for the difference, which the study's models do.

Exhibit B.23 Characteristics of Students before the Lottery Used in the Analysis of Distance from Home of College Attended, by Each Group

Characteristic	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference	*p*-Value[a]	Effect Size[b]
Gender					
Female	65.4	66.2	-0.8	.693	-0.022
Race/Ethnicity					
Hispanic	28.8	24.2	4.6	.322	0.143
White, non-Hispanic	20.3	24.8	-4.5	.286	-0.156
Black, non-Hispanic	38.6	38.2	0.4	.935	0.011
Other, non-Hispanic	12.1	12.8	-0.7	.814	-0.039
Household Characteristic					
Low-income household	87.9	86.3	1.6	.318	0.089
First generation to college	91.8	91.9	-0.1	.935	-0.009
Academic Characteristic					
Taken one or more AP/IB courses	42.9	38.2	4.7	.266	0.118
Unweighted cumulative GPA (mean)	3.2	3.2	0.0	.887	0.010
College entrance exam (mean SAT score)	896.9	886.7	10.2	.457	0.060
Baseline Proxy					
Planned to apply to college	92.9	90.5	2.4	.045	0.192
Project historical college enrollment rate	84.3	86.2	-2.0	.370	-0.193
Overall Test of Baseline Difference					
F-test[c]		p = .623			

AP is Advanced Placement. IB is International Baccalaureate. GPA is grade point average.

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant baseline difference in the characteristic indicated in the row.

[b] Effect sizes are calculated using the Hedges' G formula for continuous variables and the Cox Index for binary variables. [c] *p*-Value shown in this row is for a test of whether the *Find the Fit* and Regular UB advising groups statistically differed overall at baseline, across all characteristics shown in the table.

Notes: *Find the Fit* group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects. See Exhibit B.15 for additional details on missing baseline data. The unadjusted standard deviations for the *Find the Fit* and Regular UB advising groups, respectively, were 0.6 and 0.6 for cumulative GPA and 164.2 and 177.8 for college entrance exam.

Sample Sizes:

Gender: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
Race/ethnicity: *Find the Fit* group = 1,419 students, Regular UB advising group = 1,333 students.
Low-income household: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
First generation to college: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
Taken AP/IB course: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
GPA: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
College entrance exam score: *Find the Fit* group = 1,099 students, Regular UB advising group = 979 students.
Planned to apply to college: *Find the Fit* group = 1,204 students, Regular UB advising group = 1,120 students.
Project historical college enrollment rate: *Find the Fit* group = 1,415 students, Regular UB advising group = 1,313 students.

Source: APR 2012-13 to 2014-15; college entrance exam score data 2015; baseline student survey 2015.

Estimation Models

This section describes the study's approach to estimating the effects of *Find the Fit* on students' college going.

Main Estimation Model

The overall effect of *Find the Fit* was estimated using a statistical model. Because students are clustered within Upward Bound projects, the effect of *Find the Fit* was analyzed using two-level hierarchical linear models with students (level-1) nested in projects (level-2).[43] Linear models with conventional standard errors were used instead of non-linear models, even for outcomes such as college academic undermatch that are binary. This is because linear models are simpler to estimate and to interpret, yield unbiased estimates of the treatment effect, yield standard error estimates that are approximately correct even when the underlying data-generating process is nonlinear,[44] and have been used by many random assignment evaluations in education.[45] To estimate the effects of *Find the Fit*:

The regression model's level-1 (student-level) equation was:

$$(1)\ Y_{ij} = \beta_{0j} + \sum_{a=1}^{A} \beta_{aj} \left(BaselineStudentCharacteristics_{ij}\right) + \varepsilon_{ij}$$

Where,

i indexes students and *j* indexes projects.

Y_{ij} is the value of the outcome, such as undermatch, for the i^{th} student in the j^{th} Upward Bound project.

β_{0j} is the covariate-adjusted mean value[46] of the outcome in project *j*.

$BaselineStudentCharacteristics_{ij}$ is a set of student characteristics measured before the lottery.[47]

β_{aj} represents the relationships between the baseline student characteristics and the outcome.

ε_{ij} is random error, assumed to be identically, independently and normally distributed.

The regression model's level-2 (project-level) equation was:

$$(2)\ \beta_{0j} = \gamma_{00} + \gamma_{01}Treatment_j + \gamma_{02}Historical\ Enrollment_j + \sum_{n=3}^{9} \gamma_{0n}(RA\_Blocks_{nj}) + \mu_{oj}$$

Where,

$Treatment_j$ equals 1 for the *Find the Fit* group and 0 for the regular UB advising group.

$Historical\ Enrollment_j$ equals the project's historical college enrollment rate.

RA_Blocks_{nj} includes seven dummy variables representing the eight randomization blocks.

The effect of *Find the Fit* is given by the parameter γ_{01}. For binary variables, $\gamma_{01}$is the estimated difference between the proportion of students in *Find the Fit* projects and the proportion of students in regular UB advising projects who had a value of 1 for the outcome variable–for example, students who were undermatched at the

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43 Students were grouped within Upward Bound projects in this study, hence there are sure to be commonalities or interdependence for students from the same project. A two-level hierarchical linear model was used to estimate impacts to ensure that the model correctly accounts for the correlation among students within a project.

44 Judkins and Porter (2015).

45 Examples include the evaluation of the Teacher Incentive Fund (Max et al. 2014) and the evaluation of the Talent Transfer Initiative (Glazerman et al. 2013).

46 Mean values for binary variables are proportions. For example, if Y_{ij} has a value of 1 for students who undermatched and 0 for students who did not, then the mean is the proportion of students–or, if multiplied times 100, the percentage of students–in project *j* who undermatched. In other words, a mean of 0.48 indicates that 48 percent of students in project *j* undermatched (.48 × 100 = 48).

47 As noted previously, some students are missing data for some characteristics measured before the lottery. In these cases, missing values were imputed using the dummy variable method. The dummy variable method involves substituting a constant value, such as 0, for all missing values of a given variable, and including a dummy variable with a value of "1" for cases with a missing value and a value of "0" for cases with a non-missing value. This method is consistent with the recommendation from the IES technical methods report *What to Do When Data Are Missing in Group Randomized Controlled Trials* (Puma et al. 2009) and is allowable under the standards of the *What Works Clearinghouse*™.

college they attended. To measure the mean difference in percentage points, the estimate is multiplied times 100. For example, an estimate of .092 for γ_{01} can be multiplied times 100 (.092 × 100 = 9.2), which would indicate that the percentage of students in *Find the Fit* projects who undermatched is 9.2 percentage points higher than the percentage in regular UB advising projects. To test for impacts, the study conducted two-tailed *t*-tests at the 5 percent level. Differences that did not meet this bar for statistical significance but were just short of it ($p < .10$) were consistently identified and noted as "promising." Because the main measures of undermatch and selectivity fall into the same domain of college enrollment, the study did a Benjamini-Hochberg correction for multiple comparisons within this domain as a sensitivity test, the results are shown in Exhibit C.7b.

The study also conducted exploratory analyses among students who enrolled in college to understand whether *Find the Fit* affected some characteristics of the colleges that students attended. Examining college characteristics only for students enrolled in college is the most straightforward and logical approach, but by excluding students who do not enroll in college, the analyses fall outside the lottery framework. Therefore, the study compared the baseline characteristics of students included in these analyses to confirm that the groups were similar before the lottery (see Exhibits B.19 through B.23). The study also examined results using the full group of students in the lottery (which required assigning an arbitrary value of 0 for the outcomes of students who were not enrolled in college) and found that the results were comparable.

Covariates. All models controlled for random assignment block fixed effects to improve the precision of the estimated effects and to preserve the integrity of the random assignment because of the differing probabilities of random assignment to the *Find the Fit* or regular UB advising group within each block. In addition, the models controlled for baseline student-level covariates. Exhibit B.10 (above) summarized the covariates included in the estimation model.

Treatment of Missing Data. As noted previously there were no missing data for selectivity of the college the student attended, persistence, transfer to a less selective college or dropout, or enrollment in a familiar college. So the full randomized sample was used to analyze the impact of *Find the Fit* on these college-going measures. This implies that no bias was introduced into the estimate of the effect of *Find the Fit* on these measures because of missing outcomes. Casewise deletion (that is, excluding students with missing outcomes) was used to account for missing data on all other college-going measures.

The analyses included students with missing covariate values from the APR data or the baseline student survey. In these cases, missing values were imputed using the dummy variable method. The study replaced the missing covariate values with a placeholder (0) and created an indicator for the covariate having a missing value, which was included in the model. Simulations have shown that this approach to handling missing covariate data is likely to keep estimation bias at less than 0.05 standard deviations.[48]

Estimation Model for Subgroups

In addition to examining the overall impacts of *Find the Fit* on student outcomes, the study also investigated the impact of *Find the Fit* within subgroups defined by student and project characteristics. Exhibit B.16 (above) described the rationale for examining each subgroup and the number of students in each subgroup.

Models both (a) estimated the impact of *Find the Fit* for each of the subgroups and (b) tested for differences in impacts among categories of a subgroup indicator. Both types of results are reported in Section C; for example, impact estimates are reported for both male and female students, and the result is reported for a test of whether the magnitude of the impact for male students was different from the magnitude of the impact for female students.

Because the study was designed to detect impacts for the full sample, not differences in impacts between subgroups, a difference in impacts between subgroups could only be detected when the true difference is

[48] Puma et al. (2009).

large.[49] Because these tests are exploratory, multiple comparison adjustments were not made. It is important to note that with this approach, even if there were no significant differences, one might expect to detect as significant due to chance at least eight differences across the 144 tests conducted (9 outcomes × 16 subgroup categories).

Student Subgroups. To address questions about impacts for subgroups of students, the subgroup variable was added to the level-1 (student-level) equation. For example:

$$(3)\ Y_{ij} = \beta_{0j} + \beta_{1j}(Female_{ij}) + \sum_{a=2}^{A} \beta_{aj}\left(BaselineStudentCharacteristics_{ij}\right) + \varepsilon_{ij}$$

In addition, an interaction term between the subgroup variable and the treatment indicator was added to the level-2 (project-level) equation:

$$(4)\ \beta_{0j} = \gamma_{00} + \gamma_{01}Treatment_j + \gamma_{02}Historical\ Enrollment_j + \sum_{n=3}^{9} \gamma_{0n}(RA\_Blocks_{nj}) + \mu_{oj}$$

$$(5)\ \beta_{1j} = \gamma_{10} + \gamma_{11}Treatment_j$$

In Equations (4) and (5) above, and using the indicator for female as an example subgroup indicator, γ_{01} is the treatment impact for males, $\gamma_{01} + \gamma_{11}$ is the treatment impact for females, and γ_{11} is the difference in the treatment impact between students who are female and students who are not.

Project Subgroups. To address questions about impacts for subgroups of Upward Bound projects, the subgroup variable was added to the regression model as an interaction term with the treatment variable:

$$(6)\ \beta_{0j} = \gamma_{00} + \gamma_{01}Treatment_j + \gamma_{02}Historical\ Enrollment_j + \sum_{n=3}^{9} \gamma_{0n}(RA\_Blocks_{nj}) + \gamma_{010}RuralHostInst_j * Trt_j + \mu_{oj}$$

In Equation (6), γ_{01} is the impact for non-rural host institutions, $\gamma_{01} + \gamma_{010}$ is the impact for rural host institutions, and γ_{010} is the difference in impacts between projects hosted by rural and non-rural institutions. There is no main effect term for *RuralHostInst* because that categorization is captured in the block dummies.

Sensitivity Analyses

Sensitivity analyses were conducted to examine whether the findings were affected by the particular statistical models used to estimate the effects of *Find the Fit*. The sensitivity analyses tested whether findings remained the same when the following three alternative statistical models were used:

- Logistic regression models were estimated because logistic, rather than linear, regression is commonly used for binary outcomes.[50]
- A heteroscedasticity adjustment was included to further test the sensitivity of using linear models to estimate impacts for binary outcomes.
- Models using the full randomized sample were re-estimated without covariate adjustment because randomization should yield treatment and control groups that are similar on both observed and unobserved characteristics, making covariate adjustment unnecessary.[51]

Findings from the sensitivity analyses were similar to findings from the main analyses (see Section C for details).

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49 Detailed information on the minimum detectable effect size for each outcome in the study is provided in section B.4.3 below.

50 The logistic models, like the linear models, also account for the clustering of students within projects in the estimation of standard errors. This was accomplished using SAS Proc Glimmix.

51 The main analyses adjusted for baseline student characteristics in an effort to improve precision of the impact estimates, even though covariate adjustment was not necessary to account for baseline differences between treatment and control groups. For the analyses examining characteristics of colleges students attended, covariate adjustment is necessary because the sample is restricted to students enrolled in college.

Variation by Implementation Levels

The study explored whether impacts on any of the main outcomes varied by projects' levels of implementation of *Find the Fit*. As explained in the study's first report,[52] *Find the Fit* projects were categorized as *high implementers* if they implemented 75 percent or more of each *Find the Fit* component (personalized student folders, text messages, and training webinars for advisors); *moderate implementers* if they implemented more than a quarter but not necessarily 75 percent of each component; and *low implementers* if they implemented less than 25 percent of any one *Find the Fit* component. As implementation levels can only be observed for the *Find the Fit* projects it was necessary to predict implementation levels for the regular UB advising projects based on the relationship between project characteristics and the observed implementation level among *Find the Fit* projects. Known baseline characteristics of regular UB advising projects were used to predict whether the projects would be high, moderate, or low implementers, and the predicted implementation level was used for the subgroup analysis. The estimated implementation levels for the regular UB advising projects could differ from the actual levels if these projects had implemented *Find the Fit*. The study could have used predicted instead of the observed levels of implementation for *Find the Fit* projects to ensure that the estimation error was similar for both groups of projects. However, the study preferred not to use the predicted values when the actual values were known.

Similar to the other subgroup analyses (described above), the models both estimated the impact of *Find the Fit* for each of the implementation levels and tested for differences in impacts among the levels. *Find the Fit* group percentage and impact are estimated using the study's regression model. Results by implementation level for the main outcomes are shown in Section D.

Exploratory Analyses of Relationship between Initial College Choices and Longer-Term College Outcomes

The study also investigated descriptively whether the benefits of college quality and match identified in the literature hold true in this sample. Specifically, the study explored whether rates of persistence into the third year differed based on students' initial college choices. These analyses explored descriptive patterns for the full sample regardless of whether students were in *Find the Fit* or regular UB advising projects.

Ignoring treatment status, the study uses a two-level linear regression model to estimate the mean outcome for groups of students based on initial college choice, adjusting for the clustering of students within Upward Bound projects and for baseline covariates.

The level-1 (student-level) equation is:

$$Y_{ij} = \beta_{0j} + \sum_{s=1}^{S} \beta_{1.sj} \left(InitialCollegeChoice\ Group_{ij}\right) + \sum_{a=1}^{A} \beta_{2.aj} \left(BaselineStudentCharacteristics_{ij}\right) + \varepsilon_{ij}$$

Where all terms are defined the same as Equation (1), except as follows:

> β_{0j} is the covariate-adjusted mean value of the outcome in project *j* for the reference college-going group, such as students who did not attend college in the fall after high school.
>
> $InitialCollegeChoiceGroup_{ij}$ is the dummy variable or set of dummy variables representing the groups of students defined by initial college choices (for example dummy variables representing selectivity level of college attended, where not attending college is the reference group).
>
> $\beta_{1.sj}$ is the mean difference in the outcome for college-going group *s* compared to the reference group.
>
> The sum of β_{0j} and $\beta_{1.sj}$ is the mean outcome for group *s*.

In the level-2 (project-level) equation, the treatment indicator is omitted and all other terms are the same as in Equation (2):

(7) $\beta_{0j} = \gamma_{00} + \gamma_{02} Historical\ Enrollment_j + \sum_{n=3}^{9} \gamma_{0n}(RA\_Blocks_{nj}) + \mu_{oj}$

[52] Martinez et al. 2018.

B.4.3 Power Analyses

Power analyses determine

- how large a sample is needed for a study to confidentially find a statistically significant estimated effect, given a specified *true* effect of the intervention.

or, once the sample has been identified,

- the minimum detectable effect (MDE) that a study will have an 80 percent chance to detect.

This study was designed to detect a minimum *true* effect of 5 percentage points on the study's primary outcome, undermatch, based on a targeted number of 200 participating Upward Bound projects and with an 80 percent probability of detecting a statistically significant effect at the 5 percent level. The study-achieved minimum detectable effect for undermatch was 6.3 percentage points. This implies that our study sample was powered to detect slightly larger effects than the design phase assumptions.

The left column of Exhibit B.24 below shows the design phase assumptions and expected minimum detectable effect (MDE), whereas the right column shows the observed statistics and achieved MDE that the study, as conducted, had 80 percent power to detect on undermatch. The initial power analysis was based on specific assumptions about the number of students per project in the study sample, intraclass correlation, proportion of variance explained by covariates, and the success rate in the regular UB advising group. The actual power of the study differed slightly. That the achieved MDE was higher than the expected MDE for the undermatch outcome primarily resulted from fewer students in the regular UB advising group undermatching than the assumption made in the design phase.

Exhibit B.24 Comparison of Design Assumptions and Sample Statistics for Undermatch

	Design Phase Assumptions	Observed Statistics in Study Sample
Number of projects	200	194
Proportion assigned to *Find the Fit* group	.50	.51
Number of students per project	16	22
Intraclass correlation	.100	.082
Student-level *R*-squared	.080	.043
Project-level *R*-squared	.320	.345
Success rate[a] in regular UB advising group	.800	.409
Standard Error of Impact Estimate	0.05 SD units, or 2.0 percentage points	0.04 SD units, or 2.2 percentage points
Minimum Detectable Effect	**0.14 SD units, or 5 percentage points**	**0.16 SD units, or 6.3 percentage points**

SD is standard deviation.
[a] Proportion of students who undermatched.

The achieved MDEs for the study's main outcomes–undermatch, selectivity level of the college attended, and persistence into the third fall after high school–ranged from 2 to 6 percentage points (Exhibit B.25).

Exhibit B.25 Achieved Minimum Detectable Effects for Overall Sample

Outcome	Achieved MDE
Main Outcomes	
Undermatch (percentage points)	6.3
Selectivity level of college that student attended (percentage points):	
Most competitive	1.5
At least highly competitive	3.0
At least very competitive	4.4
At least competitive	6.3
At least somewhat competitive	6.4
Any four-year college	5.9
Any college	5.1
Persistence into or graduation by third fall after high school (percentage points)	5.0
Additional Outcomes	
College entrance exam scores of incoming freshmen (SAT scores)	28.4
Graduation rate (percentage points)	3.9
Sticker price (dollars)	2,130.30
Net price (dollars)	1,076.60
Transfer to a less selective college or dropout by the second fall after high school (percentage points)	3.7
Enrollment at host institution (percentage points)	6.2
Distance from home (miles)	34.8

SECTION C. SUPPLEMENTAL TABLES AND INFORMATION ON STUDY FINDINGS

This section includes statistical details on findings presented in the report as well as additional findings that are not in the report. The details are intended to supplement the findings presented in the report and provide the statistical information for readers interested in the technical details of the study's findings. The underlying statistics presented in section were used to generate the exhibits on the effects of *Find the Fit* on college going found in the report and could be of interest to some readers. This information is reported for the outcome measures discussed in the report ("main" measures) as well as for the exploratory measures listed in Exhibit B.10. Additionally, the exhibits below provide the results for particular groups of students and Upward Bound projects ("subgroups") as well as results from analyses examining the sensitivity (or robustness) of these effects to the statistical model chosen.

In addition, this section contains the underlying statistics used to generate the exhibits on the relationship between the selectivity level of the college students initially attended and postsecondary progress for the full randomized sample, regardless of whether students received *Find the Fit*. The underlying statistics for exhibits about the relationship between attending a familiar college—that is, the Upward Bound host institution—and postsecondary progress are also included.

C.1 Undermatch

In the report, Exhibit 7 shows that *Find the Fit* had no effect on undermatch. Exhibit C.1 presents the estimated effects of *Find the Fit* on undermatch and corresponding *p*-values. It also shows that *Find the Fit* had no effect on undermatch for any of the exploratory analyses examining subgroups of students or projects. Exhibit C.2 below shows that *Find the Fit* had no effect on undermatch regardless of the statistical model used for analysis.

Exhibit C.1 Effects on Undermatch, Overall and for Subgroups

	***Find The Fit* Group Students (%)**	**Regular UB Advising Group Students (%)**	**Estimated Impact (95% Confidence Interval)**	**Standard Error**	***p*-Value[a]**
Overall Impact					
	39.1	40.9	-1.7 (-6.1, 2.7)	2.2	.441
Impact by Student Characteristics					
Gender					
Female	36.7	38.8	-2.1 (-7.0, 2.8)	2.5	.403
Male	43.2	44.6	-1.4 (-7.2, 4.4)	3.0	.641
F-test of difference[b]			*p* = .816		
Race/Ethnicity					
Hispanic	36.3	40.4	-4.0 (-11.5, 3.4)	3.8	.290
White, non-Hispanic	47.6	51.4	-3.7 (-11.4, 3.9)	3.9	.337
Black, non-Hispanic	34.4	35.0	-0.6 (-7.0, 5.7)	3.2	.848
Other, non-Hispanic	41.7	39.1	2.5 (-7.1, 12.1)	4.9	.606
F-test of difference[b]			*p* = .620		
College Entrance Exam Score Quartile					
Highest quartile	43.6	56.3	-12.6 (-25.9, 0.7)	6.8	.063
Second quartile	42.9	46.4	-3.5 (-12.3, 5.4)	4.5	.445

	Find The Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
Third quartile	40.7	43.6	-2.9 (-10.3, 4.5)	3.8	.443
Lowest quartile	37.8	40.6	-2.8 (-8.6, 3.1)	3.0	.352
Missing score	38.0	34.7	3.3 (-3.3, 9.9)	3.4	.329
F-test of difference[b]			*p* = .205		
Impact by Project Characteristics					
Host Institution Type					
Four-year college	41.0	40.9	0.1 (-5.7, 5.9)	2.9	.969
Two-year college	36.3	41.1	-4.8 (-13.1, 3.4)	4.2	.250
Other	37.3	40.2	-3.0 (-15.9, 10.0)	6.6	.652
F-test of difference[b]			*p* = .614		
Locale					
Rural	47.9	48.3	-0.4 (-13.3, 12.6)	6.6	.957
City/suburb/town	38.0	39.9	-1.9 (-6.6., 2.8)	2.4	.424
F-test of difference[b]			*p* = .824		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the categories of the subgroup in the rows above.
Notes: Percentages represent the share of students who undermatched in their college choice. *Find the Fit* group percentages and impacts are estimated using the study's regression model.
Sample Sizes:
Overall impact: *Find the Fit* group = 2,274 students, Regular UB advising group = 1,996 students.
Gender: *Find the Fit* t group = 2,256 students, Regular UB advising group = 1,991 students.
Race/ethnicity: *Find the Fit* group = 2,249 students, Regular UB advising group = 1,988 students.
College entrance exam score quartiles: *Find the Fit* group = 2,274 students, Regular UB advising group = 1,996 students.
Host institution type: *Find the Fit* group = 2,274 students, Regular UB advising group = 1,996 students.
Locale: *Find the Fit* group = 2,274 students, Regular UB advising group = 1,996 students.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

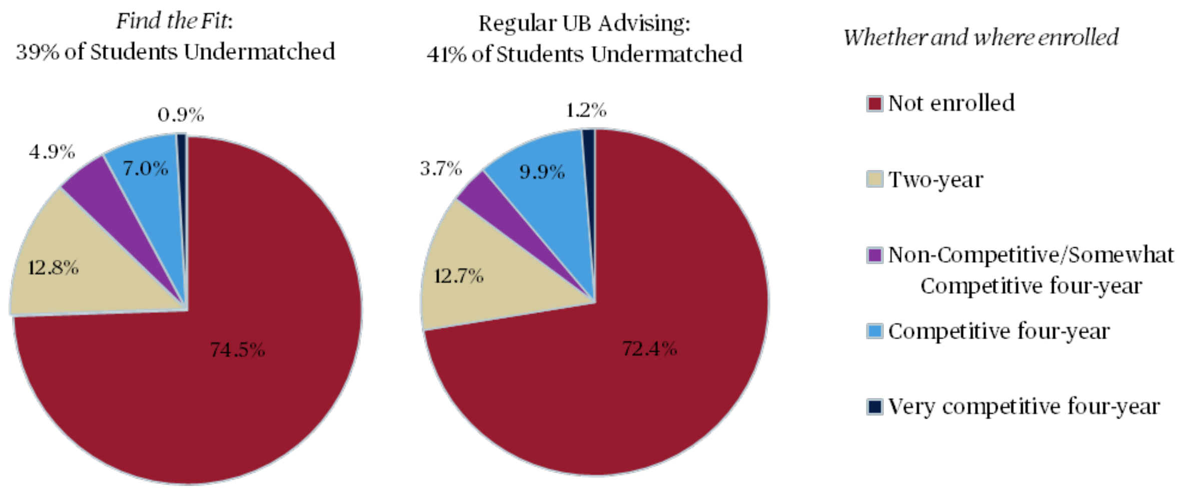
Exhibit C.2 Sensitivity Analyses for Effects on Undermatch

Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Linear regression (main model)	39.1	40.9	-1.7 (-6.1, 2.7)	2.2	.441
Logistic regression	38.4	40.9	-2.5 (-8.4, 3.5)	3.0	.415
Heteroscedasticity adjustment	39.1	40.9	-1.7 (-6.4, 2.9)	2.4	.463
No covariates used in model	38.2	40.9	-2.7 (-7.7, 2.3)	2.5	.284

Notes: Percentage represents the share of students who undermatched in their college choice. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,274 students, Regular UB advising group =1,996 students.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Undermatch can occur either because students enroll in a college that is less selective than the level to which they could be admitted or because they do not enroll in college at all. Not enrolling in college was the primary reason that students undermatched in this study. Among students who undermatched, almost three-quarters in both the *Find the Fit* projects group and regular UB advising projects group were not enrolled in college (Exhibit C.3). Only about 13 percent of undermatched students in *Find the Fit* projects and 15 percent of undermatched students in regular UB advising projects were enrolled in four-year colleges.

Exhibit C.3 Among Undermatched Students, Whether and Where Students Enrolled



Notes: Among students who undermatched, 653 *Find the Fit* group and 591 Regular UB advising group students were not enrolled, 112 *Find the Fit* group and 104 Regular UB advising group students were enrolled in two-year colleges, 43 *Find the Fit* group and 30 Regular UB advising group students were enrolled in somewhat or non-competitive four-year colleges, 61 *Find the Fit* group and 81 Regular UB advising group students were enrolled in competitive four-year colleges, and 8 *Find the Fit* group and 10 Regular UB advising group students were enrolled in very competitive four-year colleges.

Sample Size: *Find the Fit* group =877 students who were undermatched, Regular UB advising group =816 students who were undermatched.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

This study's approach to measuring undermatch was modeled after prior research,[53] but the study also conducted exploratory analyses that examined whether the findings would change if an alternative approach to measuring undermatch was used to examine the robustness of the finding. This alternative approach to measuring undermatch compared a student's college entrance exam scores to those of other incoming freshmen at the college she or he attended to assess how well the student fit academically among her or his peers.[54] The sample used to measure undermatch with this approach is more restricted because some colleges, including most two-year colleges, do not require college entrance exam scores, which means that this measure of undermatch could not be constructed for students at these colleges. Regardless, the overall finding was the same as for the "main" undermatch measure: *Find the Fit* had no effect on this alternative measure of undermatch. Exhibit C.4 below also shows that *Find the Fit* had no effect on this alternative measure of undermatch for any of the exploratory analyses that examined subgroups of students or projects. Exhibit C.5 below shows that *Find the* Fit had no effect on this exploratory measure of undermatch regardless of the statistical model used for analysis.

[53] Smith, Pender, and Howell 2013.

[54] Howell, Pender, and Kumar 2016; Page and Iriti 2016.

Exhibit C.4 Differences in Undermatch Based on College Entrance Exam Scores of Incoming Freshmen, Overall and for Subgroups

	Find the Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value[a]
Overall Difference					
	51.4	55.2	-3.8 (-8.4, 0.9)	2.4	.110
Difference by Student Characteristics					
Gender					
Female	48.8	53.0	-4.2 (-9.5, 1.0)	2.7	.113
Male	56.0	58.7	-2.6 (-8.9, 3.6)	3.2	.408
F-test of difference[b]			*p* = .640		
Race/Ethnicity					
Hispanic	47.8	55.3	-7.5 (-15.4, 0.4)	4.0	.062
White, non-Hispanic	59.1	63.4	-4.3 (-12.6, 4.0)	4.2	.310
Black, non-Hispanic	51.1	54.3	-3.2 (-10.0, 3.6)	3.5	.352
Other, non-Hispanic	44.8	40.0	4.8 (-5.8, 15.4)	5.4	.375
F-test of difference[b]			*p* = .267		
College Entrance Exam Score Quartile					
Highest quartile	54.6	57.4	-2.9 (-15.6, 9.9)	6.5	.660
Second quartile	35.7	42.5	-6.8 (-15.6, 1.7)	4.4	.118
Third quartile	47.3	47.9	-0.6 (-7.7, 6.5)	3.6	.874
Lowest quartile	57.5	62.4	-4.9 (-10.5, 0.6)	2.8	.082
F-test of difference[b]			*p* = .603		
Difference by Project Characteristics					
Host Institution Type					
Four-year college	49.0	53.4	-4.4 (-10.4, 1.7)	3.1	.156
Two-year college	59.8	62.4	-2.6 (-11.8, 6.5)	4.7	.574
Other	48.0	51.6	-3.6 (-16.7, 9.5)	6.7	.591
F-test of difference[b]			*p* = .952		
Locale					
Rural	69.0	66.0	3.0 (-11.2, 17.2)	7.2	.681
City/suburb/town	49.4	54.0	-4.6 (-9.5, 0.3)	2.5	.067
F-test of difference[b]			*p* = .322		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant difference for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of statistical differences between the categories of the subgroup in the rows above.
Notes: Differences were calculated on the sample of students who enrolled in the first year. Percentage represents the share of students who undermatched in their college choice. *Find the Fit* group percentages and differences are estimated using the study's regression model.
Sample Sizes:

Overall difference: *Find the Fit* group = 1,738 students, Regular UB advising group = 1,489 students.
Gender: *Find the Fit* group = 1,725 students, Regular UB advising group = 1,486 students.
Race/ethnicity: *Find the Fit* group = 1,719 students, Regular UB advising group = 1,484 students.
College entrance exam score quartiles: *Find the Fit* group = 1,738 students, Regular UB advising group = 1,489 students.
Host institution type: *Find the Fit* group = 1,738 students, Regular UB advising group = 1,489 students.
Locale: *Find the Fit* group = 1,738 students, Regular UB advising group = 1,489 students.

Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2013-14, 2014-15; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.5 Sensitivity Analyses for Difference in Undermatch Based on College Entrance Exam Scores of Incoming Freshmen

Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value
Linear regression (main model)	51.4	55.2	-3.8 (-8.4, 0.9)	2.4	.110
Logistic regression	49.6	55.2	-5.6 (-12.3, 1.1)	3.4	.101
Heteroscedasticity adjustment	51.4	55.2	-3.8 (-8.7, 1.2)	2.5	.133

Notes: Differences were calculated on the sample of students who enrolled in the first year. Percentage represents the share of students who undermatched in their college choice. *Find the Fit* group percentage and difference are estimated using the study's regression model
Sample Size: *Find the Fit* group = 1,738 students, Regular UB advising group = 1,489 students.
Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2013-14, 2014-15; IPEDS 2015-16; baseline student survey 2015.

C.2 Selectivity Level of the College Attended

In the report, Exhibit 8 shows that *Find the Fit* increased student attendance at colleges at the highest selectivity levels. Exhibit C.6 presents the estimated effects of *Find the Fit* on attendance at colleges at each selectivity level and corresponding *p*-values. Exhibit C.7a shows that the results of *Find the Fit* on attendance at colleges at various selectivity levels were consistent regardless of the statistical model used for analysis. Exhibit C.7b shows that the results of *Find the Fit* on undermatch and attendance at colleges at various selectivity levels were consistent after conducting a Benjamini-Hochberg correction for multiple comparisons in the enrollment domain.

For the exploratory analyses examining subgroups, positive effects of *Find the Fit* on the selectivity level of colleges that students attended were found for eight of the 16 subgroups examined, and there were no significant negative effects for any groups (Exhibits C.8 and C.9 below). For example, students in *Find the Fit* projects who were female or Black, non-Hispanic were 4 percentage points more likely than their counterparts in regular UB advising projects to enroll in a college that was at least *highly competitive* (Exhibit C.8). Likewise, among Upward Bound projects hosted by two-year colleges and those located in non-rural areas, students whose projects had access to *Find the Fit* were 4 percentage points more likely than their counterparts whose projects offered regular UB advising to attend a college that was at least *highly competitive* (Exhibit C.9). Also, positive effects on college selectivity were found not just for the most academically prepared students but for those with middle-of-the-road test scores.

Exhibit C.6 Effects on the Selectivity of the College Attended in the First Fall after High School

Selectivity Level	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Most competitive	2.2	1.3	0.9 (-0.2, 1.9)	0.5	.096
At least highly competitive	6.9	3.7	3.2 (1.1, 5.3)	1.1	.003
At least very competitive	16.4	13.1	3.3 (0.2, 6.4)	1.6	.037
At least competitive	38.8	37.8	1.0 (-3.4, 5.4)	2.2	.650
At least somewhat competitive	46.5	44.0	2.5 (-1.9, 7.0)	2.3	.266
Any four-year college	50.0	51.1	-1.1 (-5.2, 3.0)	2.1	.597
Any college	70.6	72.0	-1.4 (-5.0, 2.2)	1.8	.454

Notes: Percentage represents the share of students who attended a college of at least a given selectivity level. For example, "at least *very competitive*" includes attending colleges at the two selectivity levels above *very competitive*: *highly competitive* and *most competitive*. Differences were compared at each level by combining students who had attended colleges at that selectivity level and the levels above. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.7a Sensitivity Analyses for Effects on the Selectivity of the College Attended in the First Fall after High School

Selectivity Level, Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Most Competitive					
Linear regression (main model)	2.2	1.3	0.9 (-0.2, 1.9)	0.5	.096
Logistic regression	2.3	1.3	1.0 (0.1, 1.9)	0.4	.029
Heteroscedasticity adjustment	2.2	1.3	0.9 (-0.2, 2.0)	0.6	.110
No covariates used in model	2.5	1.3	1.1 (-0.0, 2.3)	0.6	.053
At Least Highly Competitive					
Linear regression (main model)	6.9	3.7	3.2 (1.1, 5.3)	1.1	.003
Logistic regression	6.7	3.7	3.0 (1.3, 4.7)	0.9	.001
Heteroscedasticity adjustment	6.9	3.7	3.2 (1.1, 5.3)	1.1	.003
No covariates used in model	7.3	3.7	3.6 (1.2, 6.0)	1.2	.003
At Least Very Competitive					
Linear regression (main model)	16.4	13.1	3.3 (0.2, 6.4)	1.6	.037
Logistic regression	17.5	13.1	4.4 (1.3, 7.5)	1.6	.006
Heteroscedasticity adjustment	16.4	13.1	3.3 (0.1, 6.4)	1.6	.043
No covariates used in model	17.4	13.1	4.3 (0.5, 8.2)	2.0	.028
At Least Competitive					
Linear regression (main model)	38.8	37.8	1.0 (-3.4, 5.4)	2.2	.650
Logistic regression	40.5	37.8	2.6 (-4.6, 9.8)	3.7	.473
Heteroscedasticity adjustment	38.8	37.8	1.0 (-3.6, 5.6)	2.3	.665
No covariates used in model	40.5	37.8	2.7 (-2.9, 8.3)	2.9	.350
At Least Somewhat Competitive					
Linear regression (main model)	46.5	44.0	2.5 (-1.9, 7.0)	2.3	.266
Logistic regression	48.6	44.0	4.6 (-2.9, 12.0)	3.8	.227
Heteroscedasticity adjustment	46.5	44.0	2.5 (-2.2, 7.2)	2.4	.288
No covariates used in model	48.4	44.0	4.4 (-1.3, 10.1)	2.9	.132
Any Four-Year College					
Linear regression (main model)	50.0	51.1	-1.1 (-5.2, 3.0)	2.1	.597
Logistic regression	51.8	51.1	0.8 (-2.2, 3.8)	1.5	.614
Heteroscedasticity adjustment	50.0	51.1	-1.1 (-5.4, 3.2)	2.2	.617
No covariates used in model	52.0	51.1	0.9 (-4.3, 6.1)	2.6	.735
Any College					
Linear regression (main model)	70.6	72.0	-1.4 (-5.0, 2.2)	1.8	.454
Logistic regression	72.0	72.0	0.1 (-0.1, 0.3)	0.1	.391
Heteroscedasticity adjustment	70.6	72.0	-1.4 (-5.2, 2.5)	2.0	.485
No covariates used in model	71.8	72.0	-0.1 (-4.7, 4.4)	2.3	.953

Notes: Percentage represents the share of students who attended a college of at least a given selectivity level. For example, "at least *very competitive*" includes attending colleges at the two selectivity levels above *very competitive*: *highly competitive* and *most competitive*. Differences were compared at each level by combining students who had attended colleges at that selectivity level and the levels above. *Find the Fit* group percentages and impacts are estimated using the study's regression model. Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.

Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.7b Benjamini-Hochberg correction for multiple comparisons in the enrollment domain (Undermatch and Selectivity Level)

Significant *p*-values in the domain (px)	*p*-value rank (x)	new critical *p*-value (p'x=0.5x/2)	Finding p-value <= new critical p-value? (px<= p'x)	Statistical Significance after BH correction?
0.003	1	0.025	Yes	Yes
0.037	2	0.05	Yes	Yes

Sample Size (Undermatch): *Find the Fit* group = 2,274 students, Regular UB advising group = 1,996 students.
Sample Size (Selectivity): *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.8 Effects on the Selectivity of the College Attended in the First Fall after High School, by Student Subgroup

Selectivity Level, Subgroup	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
Most Competitive					
Gender					
Female	2.8	1.3	1.5 (0.3, 2.7)	0.6	.016
Male	1.2	1.3	-0.1 (-1.7, 1.3)	0.8	.856
F-test of difference[b]			*p* = .047		
Race/Ethnicity					
Hispanic	3.1	1.4	1.7 (-0.2, 3.5)	1.0	.083
White, non-Hispanic	1.1	1.0	0.2 (-1.9, 2.0)	1.0	.878
Black, non-Hispanic	2.0	0.5	1.5 (-0.1, 3.1)	0.8	.065
Other, non-Hispanic	3.3	4.4	-1.0 (-3.6, 1.5)	1.3	.423
F-test of difference[b]			*p* = .229		
College Entrance Exam Score Quartile					
Highest quartile	17.0	11.9	5.1 (1.5, 8.6)	1.8	.005
Second quartile	4.7	3.7	1.0 (-1.4, 3.3)	1.2	.426
Third quartile	2.0	0.8	1.2 (-0.7, 3.1)	1.0	.210
Lowest quartile	0.6	0.3	0.4 (-1.1, 1.8)	0.7	.604
Missing score	1.0	0.3	0.7 (-1.0, 2.3)	0.9	.425
F-test of difference[b]			*p* = .169		
At Least Highly Competitive					
Gender					
Female	8.0	3.7	4.3 (2.0, 6.6)	1.2	.000
Male	5.0	3.8	1.2 (-1.5, 3.8)	1.4	.384
F-test of difference[b]			*p* = .016		
Race/Ethnicity					
Hispanic	7.3	4.3	3.0 (-0.3, 6.3)	1.7	.078
White, non-Hispanic	5.6	3.6	2.0 (-1.5, 5.5)	1.8	.271
Black, non-Hispanic	5.6	1.6	4.0 (1.1, 7.0)	1.5	.007
Other, non-Hispanic	12.9	9.5	3.4 (-0.9, 7.7)	2.2	.119
F-test of difference[b]			*p* = .810		

Selectivity Level, Subgroup	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
College Entrance Exam Score Quartile					
Highest quartile	30.8	19.8	11.0 (5.2, 16.8)	3.0	.000
Second quartile	18.2	12.3	5.8 (0.1, 6.8)	2.0	.004
Third quartile	6.6	3.2	3.4 (0.1, 6.8)	1.7	.042
Lowest quartile	2.2	1.2	1.1 (-1.6, 3,7)	1.3	.422
Missing score	4.8	1.3	3.5 (0.5, 6.4)	1.5	.022
F-test of difference[b]			*p* = .009		
At Least Very Competitive					
Gender					
Female	17.2	13.3	4.0 (0.6, 7.4)	1.7	.022
Male	14.9	12.9	2.1 (-1.9, 6.1)	2.0	.312
F-test of difference[b]			*p* = .341		
Race/Ethnicity					
Hispanic	18.3	13.9	4.4 (-0.6, 9.5)	2.6	.083
White, non-Hispanic	14.1	12.4	1.7 (-3.6, 7.0)	2.7	.528
Black, non-Hispanic	12.9	9.4	3.5 (-0.9, 7.9)	2.2	.114
Other, non-Hispanic	27.3	24.0	3.3 (-3.2, 9.9)	3.3	.316
F-test of difference[b]			*p* = .880		
College Entrance Exam Score Quartile					
Highest quartile	51.7	38.6	13.1 (4.1, 22.0)	4.6	.004
Second quartile	40.3	34.2	6.2 (0.1, 12.2)	3.1	.045
Third quartile	19.2	14.6	4.6 (-0.5, 9.6)	2.6	.077
Lowest quartile	7.6	6.3	1.3 (-2.7, 5.3)	2.0	.515
Missing score	10.5	8.2	2.3 (-2.2, 6.8)	2.3	.313
F-test of difference[b]			*p* = .099		
At Least Competitive					
Gender					
Female	41.4	40.1	1.3 (-3.5, 6.1)	2.4	.593
Male	34.5	34.0	0.4 (-5.1, 6.0)	2.8	.878
F-test of difference[b]			*p* = .744		
Race/Ethnicity					
Hispanic	39.2	33.7	5.4 (-1.5, 12.3)	3.5	.124
White, non-Hispanic	40.4	39.6	0.8 (-6.4, 8.1)	3.7	.820
Black, non-Hispanic	35.4	37.4	-2.0 (-8.1, 4.1)	3.1	.528
Other, non-Hispanic	44.7	42.9	1.8 (-7.1, 10.6)	4.5	.699
F-test of difference[b]			*p* = .364		
College Entrance Exam Score Quartile					
Highest quartile	79.4	70.3	9.1 (-3.0, 21.1)	6.1	.139
Second quartile	67.0	63.0	4.0 (-4.2, 12.2)	4.2	.339
Third quartile	44.1	47.7	-3.6 (-10.6, 3.3)	3.5	.302

Selectivity Level, Subgroup	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
Lowest quartile	26.8	23.9	2.9 (-2.6, 8.5)	2.8	.301
Missing score	33.0	34.0	-1.1 (-7.3, 5.2)	3.2	.738
F-test of difference[b]			*p* = .165		
At Least Somewhat Competitive					
Gender					
Female	49.8	47.1	2.6 (-2.2, 7.5)	2.5	.288
Male	41.0	38.8	2.3 (-3.4, 7.9)	2.9	.429
F-test of difference[b]			*p* = .891		
Race/Ethnicity					
Hispanic	45.7	38.7	7.0 (-0.0, 14.1)	3.6	.051
White, non-Hispanic	47.3	44.6	2.7 (-4.7, 10.1)	3.8	.469
Black, non-Hispanic	46.1	46.2	-0.2 (-6.4, 6.1)	3.2	.960
Other, non-Hispanic	47.1	45.8	1.3 (-7.8, 10.3)	4.6	.783
F-test of difference[b]			*p* = .385		
College Entrance Exam Score Quartile					
Highest quartile	82.0	73.3	8.8 (-3.5, 21.0)	6.2	.160
Second quartile	73.1	67.9	5.2 (-3.1, 13.6)	4.2	.217
Third quartile	54.2	56.0	-1.8 (-8.9, 5.2)	3.6	.614
Lowest quartile	36.2	31.5	4.8 (-0.9, 10.4)	2.9	.099
Missing score	38.4	38.2	0.3 (-6.1, 6.6)	3.2	.936
F-test of difference[b]			*p* = .238		
Any Four-Year College					
Gender					
Female	53.1	53.5	-0.4 (-5.0, 4.1)	2.3	.884
Male	44.6	47.0	-2.4 (-7.8, 2.9)	2.7	.374
F-test of difference[b]			*p* = .444		
Race/Ethnicity					
Hispanic	50.7	50.3	0.4 (-6.6, 7.0)	3.5	.903
White, non-Hispanic	49.4	48.8	0.6 (-6.4, 7.7)	3.6	.859
Black, non-Hispanic	49.2	51.7	-2.5 (-8.3, 3.4)	3.0	.410
Other, non-Hispanic	51.7	54.9	-3.2 (-12.0, 5.6)	4.5	.483
F-test of difference[b]			*p* = .801		
College Entrance Exam Score Quartile					
Highest quartile	82.6	78.2	4.4 (-7.9, 16.6)	6.2	.480
Second quartile	73.6	71.2	2.4 (-5.8, 10.6)	4.2	.565
Third quartile	56.5	60.5	-4.0 (-10.9, 2.9)	3.5	.251
Lowest quartile	40.2	39.7	0.4 (-5.1, 5.7)	2.7	.873
Missing score	43.5	47.0	-3.5 (-9.6, 2.5)	3.1	.257
F-test of difference[b]			*p* = .423		

Selectivity Level, Subgroup	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
Any College					
Gender					
Female	73.0	74.4	-1.4 (-5.5, 2.6)	2.1	.496
Male	66.6	67.7	-1.0 (-5.9, 3.9)	2.5	.681
F-test of difference[b]			*p* = .885		
Race/Ethnicity					
Hispanic	71.7	72.5	-0.8 (-7.0, 5.4)	3.2	.803
White, non-Hispanic	68.5	73.2	-4.8 (-11.2, 1.7)	3.3	.149
Black, non-Hispanic	71.6	70.9	0.7 (-4.6, 6.0)	2.7	.797
Other, non-Hispanic	70.2	71.6	-1.4 (-9.7, 6.8)	4.2	.733
F-test of difference[b]			*p* = .610		
College Entrance Exam Score Quartile					
Highest quartile	86.5	94.1	-7.6 (-19.2, 4.1)	5.9	.202
Second quartile	83.7	83.1	0.6 (-7.1, 8.3)	3.9	.887
Third quartile	73.7	77.2	-3.5 (-9.9, 2.9)	3.3	.279
Lowest quartile	65.2	64.0	1.2 (-3.7, 6.1)	2.5	.631
Missing score	67.7	70.7	-3.0 (-8.6, 2.6)	2.8	.289
F-test of difference[b]			*p* = .429		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the categories of the subgroup in the rows above.
Notes: Percentage represents the share of students who attended a college of at least a given selectivity level. For example, "at least *very competitive*" includes attending colleges at the two selectivity levels above *very competitive*: *highly competitive* and *most competitive*. Differences were compared at each level by combining students who had attended colleges at that selectivity level and the levels above. *Find the Fit* group percentages and impacts are estimated using the study's regression model.
Sample Sizes:
Gender: *Find the Fit* group = 2,318 students, Regular UB advising group = 2,102 students.
Race/ethnicity: *Find the Fit* group = 2,311 students, Regular UB advising group = 2,099 students.
College entrance exam score quartiles: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.9 Effects on the Selectivity of the College Attended in the First Fall after High School, by Project Subgroup

Selectivity Level, Subgroup	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
Most Competitive					
Host Institution Type					
Four-year college	2.2	1.3	0.9 (-0.5, 2,3)	0.7	.206
Two-year college	1.1	0.2	0.9 (-1.2, 2.8)	1.0	.376
Other	4.9	3.8	1.1 (-1.9, 4.3)	1.6	.488
F-test of difference[b]			*p* = .992		
Locale					
Rural	0.5	0.0	0.5 (-2.7, 3.7)	1.6	.749
City/suburb/town	2.4	1.5	0.9 (-0.2, 2.0)	0.6	.099

Selectivity Level, Subgroup	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
F-test of difference[b]			$p = .801$		
At Least Highly Competitive					
Host Institution Type					
Four-year college	6.4	3.6	2.7 (-0.0, 5.4)	1.4	.052
Two-year college	6.2	1.9	4.3 (0.4, 8.2)	2.0	.031
Other	10.7	7.9	2.8 (-3.4, 9.0)	3.2	.372
F-test of difference[b]			$p = .804$		
Locale					
Rural	1.8	1.3	0.6 (-5.6, 6.7)	3.1	.858
City/suburb/town	7.6	4.1	3.5 (1.3, 5.7)	1.1	.002
F-test of difference[b]			$p = .376$		
At Least Very Competitive					
Host Institution Type					
Four-year college	18.0	14.7	3.3 (-0.8, 7.3)	2.1	.111
Two-year college	11.5	8.6	2.9 (-2.9, 8.7)	3.0	.328
Other	18.1	13.9	4.2 (-5.0, 13.3)	4.7	.370
F-test of difference[b]			$p = .974$		
Locale					
Rural	6.3	2.9	3.4 (-5.8, 12.5)	4.7	.470
City/suburb/town	17.7	14.4	3.3 (-0.0, 6.6)	1.7	.052
F-test of difference[b]			$p = .984$		
At Least Competitive					
Host Institution Type					
Four-year college	41.0	41.6	-0.5 (-6.3, 5.2)	2.9	.855
Two-year college	32.3	29.5	2.8 (-5.5, 11.0)	4.2	.509
Other	40.1	35.7	4.4 (-8.6, 17.4)	6.6	.509
F-test of difference[b]			$p = .698$		
Locale					
Rural	30.6	23.4	7.2 (-5.8, 20.1)	6.6	.277
City/suburb/town	39.9	39.7	0.2 (-4.5, 4.9)	2.4	.931
F-test of difference[b]			$p = .321$		
At Least Somewhat Competitive					
Host Institution Type					
Four-year college	50.8	47.6	3.1 (-2.8, 9.0)	3.0	.297
Two-year college	35.9	32.8	3.2 (-5.2, 11.6)	4.3	.456
Other	46.5	48.1	-1.6 (-14.9, 11.7)	6.8	.812
F-test of difference[b]			$p = .806$		
Locale					
Rural	31.1	29.7	1.4 (-11.8, 14.7)	6.8	.832
City/suburb/town	48.5	45.8	2.7 (-2.1, 7.5)	2.4	.270

Selectivity Level, Subgroup	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
F-test of difference[b]			*p* = .861		
Any Four-Year College					
Host Institution Type					
Four-year college	53.5	57.5	-4.0 (-9.4, 1.3)	2.7	.144
Two-year college	39.9	35.0	4.8 (-2.9, 12.5)	3.9	.221
Other	49.9	50.4	-0.5 (-12.7, 11.5)	6.2	.933
F-test of difference[b]			*p* = .185		
Locale					
Rural	34.0	35.6	-1.6 (-13.7, 10.7)	6.2	.801
City/suburb/town	52.0	53.0	-1.0 (-5.4, 3.3)	2.2	.659
F-test of difference[b]			*p* = .930		
Any College					
Host Institution Type					
Four-year college	69.4	72.8	-3.4 (-8.0, 1.3)	2.4	.157
Two-year college	71.2	72.0	-0.8 (-7.6, 6.1)	3.5	.826
Other	74.5	67.7	6.8 (-3.7, 17.4)	5.4	.204
F-test of difference[b]			*p* = .216		
Locale					
Rural	61.6	66.9	-5.3 (-16.0, 5.4)	5.5	.329
City/suburb/town	71.7	72.6	-0.9 (-4.7, 3.0)	2.0	.658
F-test of difference[b]			*p* = .442		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the categories of the subgroup in the rows above.
Notes: Percentage represents the share of students who attended a college of at least a given selectivity level. For example, "at least *very competitive*" includes attending colleges at the two selectivity levels above *very competitive*: *highly competitive* and *most competitive*. Differences were compared at each level by combining students who had attended colleges at that selectivity level and the levels above. *Find the Fit* group percentages and impacts are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.2.1 Selectivity Level of the College Attended in the Second Fall and Third Fall after High School

The report discusses the exploratory analyses of the effects of *Find the Fit* on the selectivity of colleges that students attended two and three years after high school. Exhibit C.10 shows differences in the selectivity level of the colleges that students attended two years after high school, and Exhibit C.11 below shows differences three years after high school. These exhibits also show that the effects of *Find the Fit* on the selectivity of colleges that students attended in the second and third fall after high school remain the same regardless of the statistical model used for analysis.

Exhibit C.10 Analyses for Effects on the Selectivity of the College Attended in the Second Fall after High School

Selectivity Level, Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Most Competitive					
Linear regression (main model)	2.3	1.4	0.9 (-0.2, 2.0)	0.5	.099
Logistic regression	2.4	1.4	1.0 (0.1, 1.9)	0.5	.034
Heteroscedasticity adjustment	2.3	1.4	0.9 (-0.2, 2.0)	0.6	.117
No covariates used in model	2.5	1.4	1.1 (0.0, 2.3)	0.6	.055
At Least Highly Competitive					
Linear regression (main model)	7.0	3.7	3.3 (1.2, 5.4)	1.1	.002
Logistic regression	6.8	3.7	3.1 (1.4, 4.8)	0.9	.000
Heteroscedasticity adjustment	7.0	3.7	3.3 (1.2, 5.4)	1.1	.002
No covariates used in model	7.4	3.7	3.7 (1.3, 6.1)	1.2	.003
At Least Very Competitive					
Linear regression (main model)	15.1	11.8	3.3 (0.4, 6.2)	1.5	.025
Logistic regression	16.1	11.8	4.3 (1.5, 7.2)	1.5	.003
Heteroscedasticity adjustment	15.1	11.8	3.3 (0.3, 6.3)	1.5	.031
No covariates used in model	16.0	11.8	4.2 (0.5, 7.9)	1.9	.024
At Least Competitive					
Linear regression (main model)	34.1	32.7	1.4 (-2.5, 5.2)	2.0	.488
Logistic regression	35.3	32.7	2.6 (-2.3, 7.5)	2.5	.304
Heteroscedasticity adjustment	34.1	32.7	1.4 (-2.6, 5.3)	2.0	.499
No covariates used in model	35.5	32.7	2.8 (-2.3, 7.9)	2.6	.276
At Least Somewhat Competitive					
Linear regression (main model)	40.8	37.7	3.1 (-0.8, 6.9)	2.0	.116
Logistic regression	42.7	37.7	5.0 (-0.7, 10.7)	2.9	.084
Heteroscedasticity adjustment	40.8	37.7	3.1 (-0.9, 7.0)	2.0	.128
No covariates used in model	42.4	37.7	4.7 (-0.4, 9.7)	2.6	.073
Any Four-Year College					
Linear regression (main model)	45.0	44.1	0.9 (-2.9, 4.6)	1.9	.653
Logistic regression	47.3	44.1	3.2 (-7.8, 14.2)	5.6	.573
Heteroscedasticity adjustment	45.0	44.1	0.9 (-3.1, 4.8)	2.0	.670
No covariates used in model	46.6	44.1	2.5 (-2.4, 7.4)	2.5	.317
Any College					
Linear regression (main model)	62.4	62.3	0.2 (-3.4, 3.7)	1.8	.930
Logistic regression	64.4	62.3	2.2 (-53.4, 57.8)	28.4	.939
Heteroscedasticity adjustment	62.4	62.3	0.2 (-3.6, 3.9)	1.9	.934
No covariates used in model	63.6	62.3	1.3 (-3.4, 6.0)	2.4	.583

Notes: Percentage represents the share of students who attended a college of at least a given selectivity level. For example, "at least *very competitive*" includes attending colleges at the two selectivity levels above *very competitive*: *highly competitive* and *most competitive*. Differences were compared at each level by combining students who had attended colleges at that selectivity level and the levels above. *Find the Fit* group percentages and impacts are estimated using the study's regression model.

Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.11 Analyses for Effects on the Selectivity of the College Attended in the Third Fall after High School

Selectivity Level, Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Most Competitive					
Linear regression (main model)	2.3	1.3	1.0 (0.0, 2.1)	0.5	.056
Logistic regression	2.4	1.3	1.1 (0.1, 2.1)	0.5	.025
Heteroscedasticity adjustment	2.3	1.3	1.0 (-0.1, 2.1)	0.6	.067
No covariates used in model	2.5	1.3	1.2 (0.1, 2.4)	0.6	.033
At Least Highly Competitive					
Linear regression (main model)	6.7	3.6	3.2 (1.1, 5.2)	1.0	.002
Logistic regression	6.5	3.6	2.9 (1.3,4.5)	0.8	.000
Heteroscedasticity adjustment	6.7	3.6	3.2 (1.1, 5.2)	1.1	.003
No covariates used in model	7.1	3.6	3.5 (1.2, 5.9)	1.2	.003
At Least Very Competitive					
Linear regression (main model)	14.6	11.6	3.0 (0.1, 5.9)	1.5	.044
Logistic regression	15.5	11.6	3.9 (1.1, 6.7)	1.4	.007
Heteroscedasticity adjustment	14.6	11.6	3.0 (0.0, 6.0)	1.5	.052
No covariates used in model	15.5	11.6	3.9 (0.2, 7.5)	1.8	.037
At Least Competitive					
Linear regression (main model)	31.1	30.6	0.4 (-3.3, 4.2)	1.9	.815
Logistic regression	32.1	30.6	1.5 (-3.5, 6.4)	2.5	.568
Heteroscedasticity adjustment	31.1	30.6	0.4 (-3.4, 4.3)	2.0	.823
No covariates used in model	32.6	30.6	2.0 (-2.8, 6.8)	2.5	.420
At Least Somewhat Competitive					
Linear regression (main model)	37.0	34.5	2.5 (-1.2, 6.2)	1.9	.181
Logistic regression	38.7	34.5	4.2 (-1.2, 9.6)	2.8	.128
Heteroscedasticity adjustment	37.0	34.5	2.5 (-1.3, 6.3)	2.0	.198
No covariates used in model	38.6	34.5	4.1 (-0.7, 8.9)	2.4	.091
Any Four-Year College					
Linear regression (main model)	40.8	39.8	1.0 (-2.7, 4.7)	1.9	.596
Logistic regression	42.7	39.8	3.0 (-5.2, 11.1)	4.1	.476
Heteroscedasticity adjustment	40.8	39.8	1.0 (-2.9, 4.9)	2.0	.612
No covariates used in model	42.5	39.8	2.7 (-2.1, 7.5)	2.4	.266
Any College					
Linear regression (main model)	54.2	52.2	2.0 (-1.7, 5.6)	1.9	.294
Logistic regression	55.7	52.2	3.4 (-2.8, 9.7)	3.2	.282
Heteroscedasticity adjustment	54.2	52.2	2.0 (-1.9, 5.8)	2.0	.317
No covariates used in model	55.7	52.2	3.5 (-1.3, 8.3)	2.5	.155

Notes: Percentage represents the share of students who attended a college of at least a given selectivity level. For example, "at least *very competitive*" includes attending colleges at the two selectivity levels above *very competitive*: *highly competitive* and *most competitive*. Differences were compared at each level by combining students who had attended colleges at that selectivity level and the levels above. *Find the Fit* group percentages and impacts are estimated using the study's regression model.

Sample Size: *Find the Fit* group =2,336 students, Regular UB advising group =2,107 students.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.2.2 Alternative Definitions of Quality

In addition to examining whether *Find the Fit* affected the quality of the colleges students attended as measured by college selectivity level, the study also conducted exploratory analyses to examine whether there were differences in college quality using two alternative measures. The first alternative was the college entrance exam scores of incoming freshmen. This alternative examines the academic qualifications of students who choose to attend a given college because students with better academic qualifications can be taught at a rigorous level, and as such can be viewed as a measure of college quality. The second alternative was the college's graduation rate. A college's graduation rate provides another partial measure of quality because it reflects the instruction and supports provided by the college to help students graduate while also reflecting the characteristics of students who attend the college.

For the first alternative measure, college entrance exam scores of incoming freshmen, there was no significant difference in the quality of colleges attended by students in *Find the Fit* projects versus regular UB advising projects (Exhibit C.12 below). Similarly, there was no significant difference on this measure of college quality for any student or project subgroups examined.

Exhibit C.12 Differences between College Entrance Exam Scores of Incoming Freshmen at the Colleges Attended by *Find the Fit* and Regular UB Advising Group Students, Overall and for Subgroups

	Find the Fit Group Students (75th Percentile SAT Score)	Regular UB Advising Group Students (75th Percentile SAT Score)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value[a]
Overall Difference					
	1,172.7	1,166.1	6.6 (-13.2, 26.5)	10.1	.513
Difference by Student Characteristics					
Gender					
Female	1,174.1	1,163.8	10.2 (-10.8, 31.4)	10.8	.342
Male	1,169.2	1,171.0	-1.8 (-26.7, 23.2)	12.7	.890
F-test of difference[b]			$p = .287$		
Race/Ethnicity					
Hispanic	1,199.5	1,189.7	9.7 (-20.9, 40.4)	15.6	.534
White, non-Hispanic	1,166.8	1,165.9	0.8 (-31.8, 33.5)	16.6	.959
Black, non-Hispanic	1,133.9	1,117.5	16.4 (-10.2, 43.0)	13.5	.226
Other, non-Hispanic	1,239.5	1,262.0	-22.5 (-59.8, 14.8)	19.0	.238
F-test of difference[b]			$p = .293$		
College Entrance Exam Score Quartile					
Highest quartile	1,314.1	1,276.3	37.8 (-2.6, 78.2)	20.6	.067
Second quartile	1,237.5	1,232.8	4.7 (-25.9, 35.3)	15.6	.763
Third quartile	1,153.9	1,146.1	7.8 (-20.4, 35.9)	14.4	.588
Lowest quartile	1,116.8	1,112.7	4.1 (-21.9, 30.1)	13.2	.756
Missing score	1,158.2	1,159.4	-1.2 (-29.8, 27.4)	14.6	.935
F-test of difference[b]			$p = .513$		
Difference by Project Characteristics					
Host Institution Type					
Four-year college	1,171.4	1,168.5	3.0 (-22.3, 28.2)	12.9	.818
Two-year college	1,171.4	1,147.0	24.4 (-15.6, 64.5)	20.4	.232
Other	1,165.7	1,179.4	-13.7 (-73.4, 45.9)	30.4	.652
F-test of difference[b]			$p = .533$		

	Find the Fit Group Students (75th Percentile SAT Score)	Regular UB Advising Group Students (75th Percentile SAT Score)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value[a]
Locale					
Rural	1,166.3	1,125.0	41.3 (28.0, 110.6)	35.3	.242
City/suburb/town	1,172.5	1,169.2	3.3 (-17.4, 24.0)	10.6	.756
F-test of difference[b]			*p* = .302		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant difference for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of statistical differences between the categories of the subgroup in the rows above.
Notes: Differences were calculated on the sample of students who enrolled in the first year. The outcome is the 75th percentile of SAT scores for incoming students at the college students attended. *Find the Fit* group mean and difference are estimated using the study's regression model. The unadjusted standard deviations were 148.4 and 131.7 for the *Find the Fit* and regular UB advising groups, respectively. The SAT total score (math and verbal combined) can range from 400-1600 with a mean of 1000 and a standard deviation of 200. To convert differences to an effect size the estimated difference can be divided by the standard deviation. For example, an estimated difference of 6.6 can be converted to an effect size of 0.03 (6.6/200).
Sample Sizes:
Overall difference: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
Gender: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
Race/ethnicity: *Find the Fit* group = 982 students, Regular UB advising group = 823 students.
College entrance exam score quartiles: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
Host institution type: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
Locale: *Find the Fit* group = 986 students, Regular UB advising group = 825 students.
Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Likewise, there was no significant difference in the graduation rates of colleges attended by students in *Find the Fit* projects versus regular UB advising projects. Students in both *Find the Fit* projects and regular UB advising projects attended colleges with average graduation rates around 45 percent (Exhibit C.13). However, there were significant differences on this measure of college quality for two student subgroups: Hispanic students and students who were the most academically prepared. Among these subgroups of students, those in *Find the Fit* projects attended colleges with graduation rates that were about 4 to 7 percentage points higher, on average, than the colleges attended by their peers in regular UB advising projects.

Exhibit C.13 Differences between Graduation Rates at the Colleges Attended by *Find the Fit* and Regular UB Advising Group Students, Overall and for Subgroups

	Find the Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value[a]
Overall Difference					
	45.2	43.5	1.8 (-1.0, 4.5)	1.4	.211
Difference by Student Characteristics					
Gender					
Female	46.2	43.6	2.6 (-0.3, 5.5)	1.5	.081
Male	43.4	43.3	0.1 (-3.2, 3.5)	1.7	.947
F-test of difference[b]			*p* = .085		
Race/Ethnicity					
Hispanic	46.3	42.0	4.3 (0.1, 8.2)	2.0	.037
White, non-Hispanic	46.7	45.1	1.6 (-2.4, 6.0)	2.2	.452
Black, non-Hispanic	40.9	39.7	1.1 (-2.5, 4.8)	1.8	.541
Other, non-Hispanic	52.5	53.9	-1.4 (-6.6, 3.5)	2.6	.592
F-test of difference[b]			*p* = .219		

	Find the Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value[a]
College Entrance Exam Score Quartile					
Highest quartile	68.3	61.4	6.9 (1.0, 12.8)	3.0	.022
Second quartile	59.3	56.1	3.3 (-1.0, 7.7)	2.2	.138
Third quartile	48.9	47.5	1.4 (-2.4, 5.4)	2.0	.479
Lowest quartile	38.5	36.4	2.1 (-1.4, 5.3)	1.7	.232
Missing score	38.3	38.6	-0.2 (-3.9, 3.6)	1.9	.903
F-test of difference[b]			$p = .211$		
Difference by Project Characteristics					
Host Institution Type					
Four-year college	46.8	44.3	2.5 (-1.0, 6.1)	1.8	.164
Two-year college	39.7	39.8	-0.1 (-5.2, 5.1)	2.6	.970
Other	48.6	46.3	2.3 (-6.1, 10.8)	4.3	.585
F-test of difference[b]			$p = .706$		
Locale					
Rural	39.6	37.8	1.8 (-6.9, 10.6)	4.5	.687
City/suburb/town	45.7	44.0	1.7 (-1.2, 4.6)	1.5	.238
F-test of difference[b]			$p = .990$		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant difference for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of statistical differences between the categories of the subgroup in the rows above.
Notes: Differences were calculated on sample of students who enrolled in the first year. The outcome is the graduation rate at the college students attended. *Find the Fit* group percentages and differences are estimated using the study's regression model. The unadjusted standard deviations were 22.9 and 22.2 for the *Find the Fit* and Regular UB advising groups, respectively.
Sample Sizes:
Overall difference: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
Gender: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
Race/ethnicity: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,330 students.
College entrance exam score quartiles: *Find the Fit group* 1,422 students, Regular UB advising group = 1,333 students.
Host institution type: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
Locale: *Find the Fit* group = 1,422 students and Regular UB advising group = 1,333 students.
Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.3 Persistence

In the report, Exhibit 12 shows that *Find the Fit* had no significant effect on persistence into the third year. However, *Find the Fit* did have positive effects on persistence for three of the 16 exploratory subgroups examined–students who were female, Hispanic, or among the less academically prepared (Exhibit C.14). These positive effect on persistence, measured as being continuously enrolled into the third fall after high school or completing a degree by that time, ranged from about 4 to 8 percentage points. Exhibit C.15 below shows that *Find the Fit* had no effect on persistence for the full sample regardless of the statistical model used for analysis.

Exhibit C.14 Effects on Continuous Enrollment into or Graduation by the Third Fall after High School, Overall and for Subgroups

	Find the Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
Overall Impact					
	51.5	49.1	2.4 (-1.1, 5.9)	1.8	.175
Impact by Student Characteristics					
Gender					
Female	55.1	50.9	4.2 (0.2, 8.2)	2.1	.042
Male	45.6	46.1	-0.5 (-5.5, 4.5)	2.6	.831
F-test of difference[b]		p = .094			
Race/Ethnicity					
Hispanic	57.5	50.9	6.6 (0.2, 12.9)	3.2	.042
White, non-Hispanic	49.5	48.8	0.7 (-5.8, 7.3)	3.4	.826
Black, non-Hispanic	49.9	46.9	3.0 (-2.3, 8.3)	2.7	.273
Other, non-Hispanic	50.1	53.1	-3.0 (-11.5, 5.6)	4.4	.497
F-test of difference[b]		p = . 290			
College Entrance Exam Score Quartile					
Highest quartile	75.2	85.1	-9.9 (-22.2, 2.4)	6.3	.114
Second quartile	63.9	63.0	1.0 (-7.1, 9.0)	4.1	.811
Third quartile	56.4	57.6	-1.2 (-7.8, 5.5)	3.4	.734
Lowest quartile	44.7	37.1	7.5 (2.6, 12.5)	2.5	.003
Missing score	48.2	47.5	0.7 (-5.0, 6.4)	2.9	.806
F-test of difference[b]		p = .028			
Impact by Project Characteristics					
Host Institution Type					
Four-year college	51.0	50.3	0.7 (-3.8, 5.3)	2.3	.759
Two-year college	51.1	45.3	5.7 (-1.0, 12.5)	3.5	.097
Other	53.7	50.4	3.3 (-7.0, 13.6)	5.3	.528
F-test of difference[b]		p= .474			
Locale					
Rural	43.4	46.0	-2.7 (-13.2¸7.8)	5.3	.618
City/suburb/town	52.5	49.5	3.1 (-0.7, 6.8)	1.9	.106
F-test of difference[b]		p = .313			

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the categories of the subgroup in the rows above.
Notes: The outcome is continuous enrollment in any college between July 1, 2016 (immediately after high school) and October 1, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by October 1, 2018. *Find the Fit* group percentages and impacts are estimated using the study's regression model.
Sample Sizes:
Overall impact: *Find the Fit* t group = 2,336 students, Regular UB advising group = 2,107 students.
Gender: *Find the Fit* group = 2,318 students, Regular UB advising group = 2,102 students.
Race/ethnicity: *Find the Fit* group = 2,311 students, Regular UB advising group = 2,099 students.
College entrance exam score quartiles: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Host institution type: *Find the Fit* t group = 2,336 students, Regular UB advising group = 2,107 students.
Locale: *Find the Fit* t group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

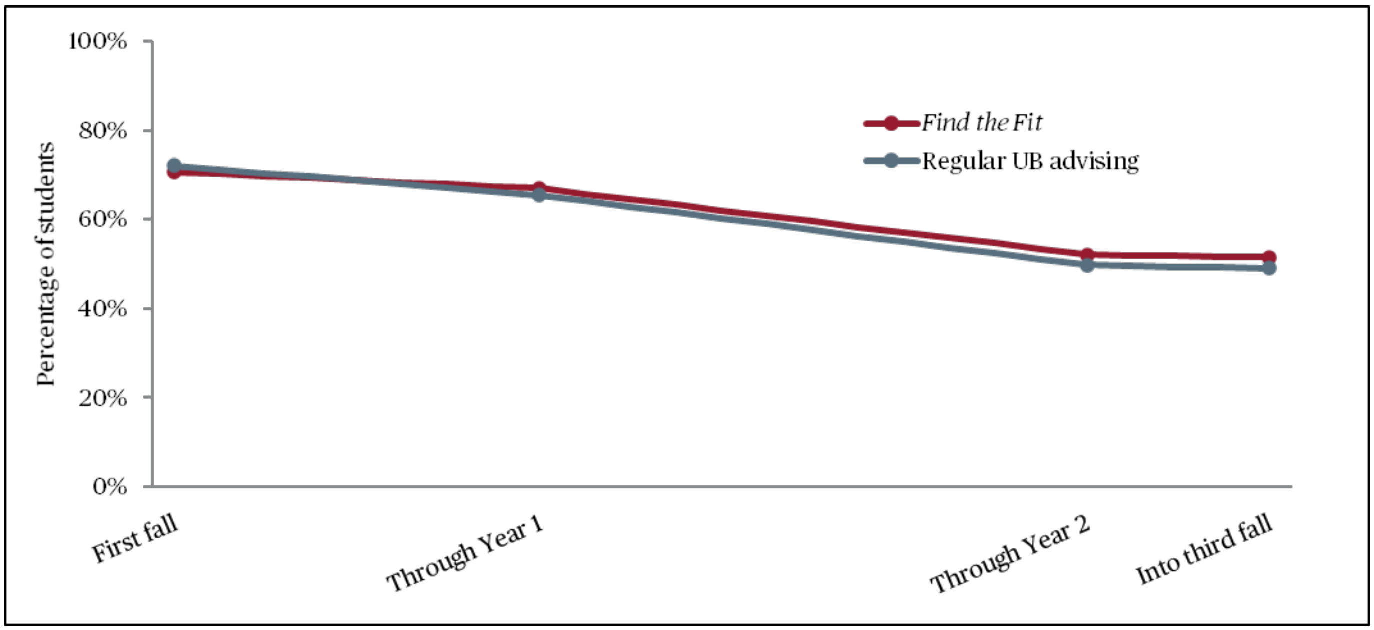
Exhibit C.15 Sensitivity Analyses for Effects on Continuous Enrollment into or Graduation by the Third Fall after High School

Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Linear regression (main model)	51.5	49.1	2.4 (-1.1, 5.9)	1.8	.175
Logistic regression	53.0	49.1	4.0 (-1.7, 9.6)	2.9	.169
Heteroscedasticity adjustment	51.5	49.1	2.4 (-1.3, 6.1)	1.9	.428
No covariates used in model	52.9	49.1	3.8 (-1.1, 8.8)	2.3	.220

Notes: The outcome is continuous enrollment in any college between July 1, 2016 (immediately after high school) and October 1, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by October 1, 2018. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

To explore whether *Find the Fit* affected postsecondary progress during the intervening years between the first and third falls after high school, the study conducted exploratory analyses to examine persistence at intermediate timepoints. Although there were no statistically significant impacts on progress through college, the difference in persistence between students in the *Find the Fit* and regular UB advising projects might have increased over time (Exhibit C.16). However, as Exhibits C.17 and C.18 below show, this difference was never statistically significant. That is, there were no statistically significant effects of *Find the Fit* on persistence throughout the first year (Exhibit C.17) or two years after high school (Exhibit C.18). The results were the same regardless of the statistical model used for analysis.

Exhibit C.16 Impact of *Find the Fit* on Whether Students Enrolled and Persisted in College after High School



Notes: Data include 2,336 students in *Find the Fit* projects and 2,107 students in regular UB advising projects. Percentage of students represents the share of students who were (a) continuously enrolled in college from July 1, 2016 (immediately after high school graduation) through each time point (June 30, 2017 (Y1); June 30, 2018 (Y2); or October 1, 2018 (fall Y3)) without an interruption in enrollment of five or more consecutive months; or (b) graduated with any postsecondary degree or certificate by each time point (June 30, 2017, or 2018, or October 1, 2018). Percentage for students in *Find the Fit* projects and impact are estimated using the study's statistical model. UB is Upward Bound.
Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014.

Exhibit C.17 Overall Effect and Sensitivity Analyses for Effects on Continuous Enrollment through the First Year after High School

Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Linear regression (main model)	67.0	65.5	1.5 (-1.94.9)	1.7	.386
Logistic regression	68.9	65.5	3.3 (-5.2, 11.8)	4.3	.441
Heteroscedasticity adjustment	67.0	65.5	1.5 (-2.2, 5.2)	1.9	.428
No covariates used in model	68.4	65.5	2.8 (-1.7, 7.4)	2.3	.220

Notes: The outcome is continuous enrollment in any college between July 1, 2016 (immediately after high school) and June 30, 2017, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by June 30, 2017. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.18 Overall Effect and Sensitivity Analyses for Effects on Continuous Enrollment throughout the First Two Years after High School

Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Linear regression (main model)	52.1	49.7	2.4 (-1.0, 5.9)	1.8	.172
Logistic regression	53.9	49.7	4.2 (-1.7, 10.1)	3.0	.167
Heteroscedasticity adjustment	52.1	49.7	2.4 (-1.2¸6.0)	1.9	.193
No covariates used in model	53.6	49.7	3.8 (-1.1¸8.7)	2.5	.124

Notes: The outcome is continuous enrollment in any college between July 1, 2016 (immediately after high school) and June 30, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by June 30, 2018. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.4 Hypothesized Negative Consequences

Though a shift to more selective colleges ideally would lead to improved later outcomes for students, it is also possible it could lead to unintended negative consequences for students.[55] One potential negative consequence could be higher college costs as more selective colleges typically have a higher average posted cost (sometimes called "sticker price") than less selective colleges do.[56] However, more selective colleges often have more resources and are able to keep students' costs down by making grants and scholarships available to low-income students such as those in Upward Bound. As a result, college selectivity does not necessarily correspond to higher out-of-pocket costs; that is, net prices.[57] Another possible negative consequence could occur if students

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55 Given the small increase in the number of students who enrolled in more selective colleges as a result of *Find the Fit*, any unintended negative consequences may not affect enough students to be detected.

56 On average, as college selectivity increases so too does the sticker price, based on author's calculated correlation between the posted cost of attendance for the full academic year for first-time, full-time students in the IPEDS data and the NCES-Barron's Admissions Competitiveness Index of the colleges. The correlation is 0.53 for in-state sticker price and 0.65 for out-of-state sticker price.

57 College selectivity does not necessarily correspond to higher out-of-pocket costs, based on author's calculated correlation between the estimated cost a student with a family income below $30,000 would pay to attend a college, after taking into account scholarships and grants, according to the IPEDS data and the NCES-Barron's Admissions Competitiveness Index. The correlation is –0.01. IPEDS provides the estimated net price for students with family incomes in different ranges. This study uses the lowest income range provided by IPEDS: under $30,000. Some 88 percent of students in the study are low income according to Upward Bound's definition, which defines low income as being at or below 150 percent of the poverty line for the previous year. The poverty line varies by household size, but for households with three or more people, a family income below $30,000 qualified as low income at the time the study was conducted.

are less academically prepared than their peers, find themselves struggling academically, and so are more likely to drop out or transfer to a less selective college.

C.4.1 Sticker Price

In the report, Exhibit 10 shows the results from the exploratory analyses examining sticker price among students who enrolled in college. Students in *Find the Fit* projects attended colleges with higher average sticker prices than did students in regular UB advising projects. This was true for all of the subgroups examined, though not all of the differences were statistically significant (Exhibit C.19). The average difference in sticker price between the colleges attended by students in *Find the Fit* projects versus regular UB advising projects ranged from a high of more than $5,000 for the most academically prepared students to a low of about $500 for students who had no reported college entrance exam scores.

Exhibit C.19 Differences between Sticker Prices at Colleges Attended by *Find the Fit* and Regular UB Advising Group Students, Overall and for Subgroups

	Find the Fit Group Students ($)	Regular UB Advising Group Students ($)	Estimated Difference (95% Confidence Interval)	Standard Error	p-Value[a]
Overall Difference					
	25,924.60	24,109.30	1,815.30 (324.8, 3305.8)	760.1	.017
Difference by Student Characteristics					
Gender					
Female	26,245.50	24,364.80	1,880.70 (319.1, 3442.2)	796.3	.018
Male	25,296.40	23,609.20	1,687.20 (-60.0, 3434.4)	891.0	.058
F-test of difference[b]			p = .783		
Race/Ethnicity					
Hispanic	25,128.20	23,900.80	1,227.40 (849.2, 3304.0)	1,059.0	.247
White, non-Hispanic	26,249.30	23,904.30	2,345.00 (151.8, 4538.2)	1,118.4	.036
Black, non-Hispanic	25,717.80	23,513.60	2,204.10 (295.4, 4112.8)	973.4	.024
Other, non-Hispanic	27,225.00	26,511.50	713.50 (-1863.4, 3290.3)	1,314.1	.587
F-test of difference[b]			p = .567		
College Entrance Exam Score Quartile					
Highest quartile	35,214.70	29,762.30	5,452.40 (2492.3, 8412.4)	1,509.5	.000
Second quartile	31,261.90	27,649.10	3,612.70 (1384.4, 5841.0)	1,136.4	.001
Third quartile	26,723.10	25,055.40	1,667.70 (-352.4, 3687.8)	1,030.2	.106
Lowest quartile	24,056.80	22,518.90	1,537.90 (-237.1, 3312.8)	905.2	.089
Missing score	22,762.10	22,214.60	547.50 (-1396.2, 2491.3)	991.2	.581
F-test of difference[b]			p = .008		
Difference by Project Characteristics					
Host Institution Type					
Four-year college	26,816.50	24,768.40	2,048.10 (97.1, 3999.0)	994.9	.040
Two-year college	23,735.80	22,296.20	1,439.50 (-1346.8, 4225.9)	1,421.0	.311
Other	25,476.80	23,883.60	1,593.20 (-3027.5, 6213.9)	2,356.4	.499
F-test of difference[b]			p = .935		

	Find the Fit Group Students ($)	Regular UB Advising Group Students ($)	Estimated Difference (95% Confidence Interval)	Standard Error	p-Value[a]
Locale					
Rural	24,063.60	20,803.10	3,260.50 (6213.8, 7992.8)	2,413.3	.177
City/suburb/town	26,060.70	24,404.20	1,656.50 (83.6, 3229.4)	802.1	.039
F-test of difference[b]			*p* = .528		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant difference for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of statistical differences between the categories of the subgroup in the rows above.
Notes: Differences were calculated on the sample of students who enrolled in the first year. The outcome is the average posted cost of tuition, fees, and living expenses ("sticker price") of colleges attended. *Find the Fit* group cost and difference are estimated using the study's regression model. The unadjusted standard deviations were $10,614.1 and $9,924.9 for the *Find the Fit* and regular UB advising groups, respectively.

Sample Sizes:
Overall difference: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
Gender: *Find the Fit* t group = 1,418 students, Regular UB advising group = 1,331 students.
Race/ethnicity: *Find the Fit* group = 1,414 students, Regular UB advising group = 1,328 students.
College entrance exam score quartiles: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
Host institution type: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
Locale: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,331 students.
Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.4.2 Net Price

In the report, Exhibit 10 the results from the exploratory analyses examining net price. There was no significant difference in the likely out-of-pocket costs of college for students in *Find the Fit* projects versus regular UB advising projects. This was also true for most subgroups of students and projects examined (Exhibit C.20). The one exception was for students in the lowest quartile of college entrance exam scores. Among these students, those in *Find the Fit* projects attended colleges with a significantly higher average estimated net price than did those in regular UB advising projects (about $9,800 versus $8,800 per year). Therefore, *Find the Fit* could have led the least academically prepared students to attend colleges that were about $1,000 more expensive for them per year, on average, than the colleges they otherwise would have attended.

Exhibit C.20 Differences between Net Price at Colleges Attended by *Find the Fit* and Regular UB Advising Group Students, Overall and for Subgroups

	Find the Fit Group Students ($)	Regular UB Advising Group Students ($)	Estimated Difference (95% Confidence Interval)	Standard Error	p-Value[a]
Overall Difference					
	10,183.30	9,586.90	596.40 (-156.9, 1349.6)	384.1	.121
Difference by Student Characteristics					
Gender					
Female	10,389.50	9,688.10	701.40 (-92.8, 1495.6)	405.0	.083
Male	9,779.90	9,389.00	390.90 (-508.1, 1289.9)	458.5	.394
F-test of difference[b]			*p* = .411		
Race/Ethnicity					
Hispanic	9,240.50	8,846.20	394.40 (-684.3, 1473.0)	550.1	.473
White, non-Hispanic	10,320.20	9,753.90	566.30 (-573.2, 1705.7)	581.1	.330
Black, non-Hispanic	10,749.00	10,094.50	654.50 (-328.2, 1637.1)	501.1	.192

	Find the Fit Group Students ($)	Regular UB Advising Group Students ($)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value[a]
Other, non-Hispanic	10,023.00	9,098.50	924.50 (-431.4, 2280.4)	691.5	.181
F-test of difference[b]			*p* =. 909		
College Entrance Exam Score Quartile					
Highest quartile	11,265.40	10,145.90	1,119.50 (-451.1, 2690.1)	801.0	.162
Second quartile	11,478.80	10,667.40	811.30 (-355.1, 1977.7)	594.8	.173
Third quartile	10,430.50	10,299.30	131.20 (-917.4, 1179.7)	534.7	.806
Lowest quartile	9,841.80	8,829.20	1,012.50 (101.7, 1923.4)	464.5	.029
Missing score	9,510.40	9,338.60	171.80 (-833.3, 1176.9)	512.6	.738
F-test of difference[b]			*p* = .288		
Difference by Project Characteristics					
Host Institution Type					
Four-year college	10,835.90	10,062.80	773.10 (-202.9, 1749.0)	497.7	.120
Two-year college	9,311.60	8,629.40	682.10 (-719.7, 2083.9)	714.9	.340
Other	8,191.20	8,743.10	-552.00 (-2862.4, 1758.4)	1178.2	.639
F-test of difference[b]			*p*= .581		
Locale					
Rural	10,473.30	9,233.00	1,240.30 (-1159.4, 3639.9)	1,223.8	.311
City/suburb/town	10,144.30	9,618.40	525.90 (-268.7, 1320.6)	405.3	.194
F-test of difference[b]			*p* = .579		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant difference for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of statistical differences between the categories of the subgroup in the rows above.
Notes: Differences were calculated on the sample of students who enrolled in the first year. The outcome is the average estimated cost of attendance after scholarships and grants ("net price") for students from households with incomes below $30,000. *Find the Fit* group cost and difference are estimated using the study's regression model. The unadjusted standard deviations were $5,313.1 and $5,093.4 for the *Find the Fit* and regular UB advising groups, respectively.
Sample Sizes:

Overall difference: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
Gender: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
Race/ethnicity: *Find the Fit* group = 1,418 students, Regular UB advising group = 1,330 students.
College entrance exam score quartiles: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
Host institution type: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.
Locale: *Find the Fit* group = 1,422 students, Regular UB advising group = 1,333 students.

Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.4.2 Dropout or Transfer to a Less Selective College

In the report, Exhibit 11 shows the results from the exploratory analyses examining dropout or transfer to a less selective college. Students in *Find the Fit* projects were no more likely than those in regular UB advising projects to drop out of college or transfer to a less selective college by the second fall after high school. Likewise, there was no statistically significant impact of *Find the Fit* on dropout or transfer for any student or project subgroup (Exhibit C.21).

Exhibit C.21 Effects on Dropout or Transfer to a Less Selective College, Overall and for Subgroups

	Find the Fit **Group Students (%)**	**Regular UB Advising Group Students (%)**	**Estimated Impact (95% Confidence Interval)**	**Standard Error**	***p*-Value[a]**
Overall Impact					
	18.7	20.0	-1.3 (-3.9, 1.4)	1.3	.347
Impact by Student Characteristics					
Gender					
Female	17.9	20.5	-2.6 (-5.7, 0.6)	1.6	.110
Male	20.2	19.1	1.1 (-3.0, 5.2)	2.1	.595
F-test of difference[b]			*p* = .136		
Race/Ethnicity					
Hispanic	15.6	20.3	-4.7 (-9.7, 0.4)	2.6	.069
White, non-Hispanic	19.7	21.4	-1.7 (-6.9, 3.5)	2.7	.517
Black, non-Hispanic	18.9	20.3	-1.4 (-5.5, 2.7)	2.1	.517
Other, non-Hispanic	22.1	16.0	6.1 (-0.9, 13.1)	3.6	.088
F-test of difference[b]			*p* = .100		
College Entrance Exam Score Quartile					
Highest quartile	9.7	11.9	-2.2 (-12.8, 8.4)	5.4	.687
Second quartile	17.3	20.6	-3.2 (-10.1¸3.6)	3.5	.354
Third quartile	16.6	19.1	-2.5 (-8.0¸ 3.1)	2.8	.384
Lowest quartile	21.5	21.7	-0.3 (-4.3, 3.8)	2.1	.900
Missing score	18.5	19.4	-0.9 (-5.6, 3.8)	2.4	.713
F-test of difference[b]			*p* = .933		
Impact by Project Characteristics					
Host Institution Type					
Four-year college	18.1	19.4	-1.2 (-4.6¸2.1)	1.7	.470
Two-year college	19.5	22.9	-3.4 (-8.6¸1.9)	2.7	.208
Other	20.2	17.3	2.9 (-4.7, 10.5)	3.9	.453
F-test of difference[b]			*p* = .419		
Locale					
Rural	15.8	17.6	-1.7 (-9.8, 6.3)	4.1	.674
City/suburb/town	19.1	20.3	-1.2 (-4.0, 1.6)	1.4	.399
F-test of difference[b]			*p* = .903		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the categories of the subgroup in the rows above.
Notes: The outcome is the share of students who dropped out or transferred to a less selective school by the start of Year 2 (October 1, 2017). *Find the Fit* group percentage and impact are estimated using the study's regression model.

Sample Sizes:

Overall difference: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Gender: *Find the Fit* group = 2,318 students, Regular UB advising group = 2,102 students.
Race/ethnicity: *Find the Fit* group = 2,311 students, Regular UB advising group = 2,099 students.
College entrance exam score quartiles: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Host institution type: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Locale: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students for locale.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.22 Sensitivity Analyses for Impact on Dropout or Transfer to a Less Selective College

Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Linear regression (main model)	18.7	20.0	-1.3 (-3.9, 1.4)	1.3	.347
Logistic regression	18.4	20.0	-1.6 (-4.8, 1.7)	1.6	.339
Heteroscedasticity adjustment	18.7	20.0	-1.3 (-4.0, 1.5)	1.4	.368
No covariates used in model	18.4	20.0	-1.6 (-4.3, 1.2)	1.4	.259

Notes: The outcome is the share of students who dropped out or transferred to a less selective college by the second fall after high school. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.5 Familiarity of the College Attended

Because local and familiar colleges are often the default for low-income and first-generation college students, *Find the Fit* encouraged students to consider attending less-familiar colleges. The study examined whether there was an impact on student enrollment in a familiar college measured in two ways: (1) as the average distance of their college from the Upward Bound host institution and (2) as enrollment in the Upward Bound host institution. The results from these exploratory analyses are discussed below.

C.5.1 Distance from Home

There was no significant difference between students from *Find the Fit* projects versus regular UB advising projects in the average distance from the college they attended to their Upward Bound host institution (Exhibit C.23).[58] However, *Find the Fit* might have encouraged Black, non-Hispanic students to attend colleges that were significantly farther from home: those in *Find the Fit* projects attended colleges that were an average of 127 miles from their host institution, compared to an average of 89 miles for Black, non-Hispanic students in regular UB advising projects.

[58] Because the study did not have access to students' home addresses, the address of students' Upward Bound host institution (the institution where students participated in Upward Bound activities) was used instead.

Exhibit C.23 Differences in Distance from Home of Colleges Attended by *Find the Fit* and Regular UB Advising Group Students, Overall and for Subgroups

	Find the Fit Group Students (Miles)	Regular UB Advising Group Students (Miles)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value[a]
Overall Difference					
	116.4	102.1	14.2 (-10.1, 38.6)	12.4	.252
Difference by Student Characteristics					
Gender					
Female	109.6	98.8	10.9 (-17.6, 39.3)	14.5	.455
Male	129.4	108.7	20.7 (-16.7, 58.8)	19.1	.278
F-test of difference[b]			*p* = .654		
Race/Ethnicity					
Hispanic	115.2	90.1	25.1 (-19.8,70.0)	22.9	.273
White, non-Hispanic	105.6	116.2	-10.6 (-58.3, 37.0)	24.3	.662
Black, non-Hispanic	127.4	88.6	38.8 (1.2, 76.4)	19.2	.043
Other, non-Hispanic	99.3	138.6	-39.3 (-103.0, 24.4)	32.5	.226
F-test of difference[b]			*p* = .122		
College Entrance Exam Score Quartile					
Highest quartile	252.6	230.3	22.3 (-60.7, 105.2)	42.3	.598
Second quartile	135.1	104.7	30.5 (-26.2, 87.1)	28.9	.292
Third quartile	120.6	89.1	31.5 (-16.8, 79.8)	24.6	.200
Lowest quartile	112.7	97.0	15.7 (-21.8, 53.1)	19.1	.411
Missing score	76.5	84.7	-8.2 (-52.2, 35.8)	22.4	.715
F-test of difference[b]			*p* = .754		
Difference by Project Characteristics					
Host Institution Type					
Four-year college	114.9	112.3	2.6 (-28.4, 33.5)	15.8	.871
Two-year college	107.7	70.9	36.8 (-12.2, 85.7)	25.0	.141
Other	133.6	105.5	28.1 (-44.5, 100.7)	37.0	.448
F-test of difference[b]			*p* = .470		
Locale					
Rural	144.0	131.3	12.8 (-71.5, 97.0)	43.0	.767
City/suburb/town	113.9	99.6	14.3 (-11.1, 39.8)	13.0	.270
F-test of difference[b]			*p* = .972		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant difference for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of statistical differences between the categories of the subgroup in the rows above.
Notes: Differences were calculated on the sample of students who enrolled in the first year. Distance represents the average number of miles between the college attended and students' Upward Bound host institution. *Find the Fit* group distance and difference are estimated using the study's regression model. The unadjusted standard deviations were 274.0 and 278.6 for the *Find the Fit* and regular UB advising groups, respectively.
Sample Sizes:
Overall difference: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
Gender: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
Race/ethnicity: *Find the Fit* group = 1,419 students, Regular UB advising group = 1,333 students.
College entrance exam score quartiles: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
Host institution type: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
Locale: *Find the Fit* group = 1,423 students, Regular UB advising group = 1,336 students.
Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.5.2 Enrollment in Upward Bound Host Institution

Exploratory analyses show that there was no significant difference between students from *Find the Fit* projects versus regular UB advising projects in attendance at their Upward Bound host institution after high school (Exhibit C.24 below). *Find the Fit* did have a statistically significant effect on this measure of institutional familiarity for three subgroups: female students; students who were not Black, White, or Hispanic; and students whose Upward Bound projects were hosted by two-year colleges. For example, among students whose Upward Bound projects were hosted by two-year colleges, those in *Find the Fit* projects were about 8 percentage points less likely to enroll in their host institution than their counterparts in regular UB advising projects. These results were not sensitive to the model specification (Exhibit C.25 below).

Exhibit C.24 Effects on Enrollment at Upward Bound Host Institution, Overall and for Subgroups

	Find the Fit **Group Students (%)**	**Regular UB Advising Group Students (%)**	**Estimated Impact (95% Confidence Interval)**	**Standard Error**	***p*-Value[a]**
Overall Impact					
	14.7	18.9	-4.3 (-8.6, 0.0)	2.2	.052
Impact by Student Characteristics					
Gender					
Female	14.7	19.4	-4.6 (-9.3, 0.0)	2.4	.049
Male	14.7	18.1	-3.4 (-8.6, 1.7)	2.6	.194
F-test of difference[b]			$p = .579$		
Race/Ethnicity					
Hispanic	13.1	17.0	-3.9 (-10.2, 2.5)	3.2	.232
White, non-Hispanic	19.2	23.7	-4.5 (-11.2, 2.1)	3.4	.182
Black, non-Hispanic	11.2	14.1	-2.8 (-8.6, 2.9)	2.9	.330
Other, non-Hispanic	19.6	27.6	-8.1 (-15.9, -0.2)	4.0	.045
F-test of difference[b]			$p = .681$		
College Entrance Exam Score Quartile					
Highest quartile	17.3	26.7	-9.4 (-19.7, 0.9)	5.2	.073
Second quartile	12.0	17.3	-5.3 (-12.4, 1.9)	3.7	.151
Third quartile	11.5	17.2	-5.8 (-12.0, 0.4)	3.2	.068
Lowest quartile	14.4	16.1	-1.6 (-6.8, 3.6)	2.6	.539
Missing score	17.6	23.0	-5.4 (-11.1, 0.2)	2.9	.061
F-test of difference[b]			$p = .414$		
Impact by Project Characteristics					
Host Institution Type					
Four-year college	13.7	17.6	-3.9 (-8.8, 1.0)	2.5	.122
Two-year college	24.4	32.0	-7.6 (-14.6, -0.6)	3.6	.034
Other	0.3	0.0	0.3 (-10.9, 11.5)	5.7	.958
F-test of difference[b]			$p = .480$		

	Find the Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
Locale					
Rural	20.1	30.1	-10.0 (-22.7, 2.7)	6.5	.122
City/suburb/town	14.0	17.5	-3.5 (-8.1, 1.1)	2.3	.133
F-test of difference[b]			*p* = .347		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the subgroup category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the categories of the subgroup in the rows above.
Notes: The outcome is the share of students who enrolled in their Upward Bound host institution. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Sizes:
Overall impact: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Gender: *Find the Fit* group = 2,318 students, Regular UB advising group = 2,102 students.
Race/ethnicity: *Find the Fit* group = 2,311 students, Regular UB advising group = 2,099 students.
College entrance exam score quartiles: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students
Host institution type: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Locale: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.25 Sensitivity Analyses for Impact on Familiarity of the College Attended

Model	*Find the Fit* Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value
Linear regression (main model)	14.7	18.9	-4.3 (-8.6, 0.0)	2.2	.052
Logistic regression	14.5	18.9	-4.5 (-8.7, -0.2)	2.2	.041
Heteroscedasticity adjustment	14.7	18.9	-4.3 (-8.8, 0.3)	2.3	.064
No covariates used in model	14.6	18.9	-4.3 (-8.7, 0.1)	2.2	.054

Notes: The outcome is the share of students who enrolled in their Upward Bound host institution. *Find the Fit* group percentage and impact are estimated using the study's regression model.
Sample Size: *Find the Fit* group = 2,336 students, Regular UB advising group = 2,107 students.
Source: FSA 2017; NSC 2016; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

C.6 Relational Analyses

Some research suggests that enrolling in a more selective college is associated with higher rates of college persistence.[59] This relationship is likely due in part to differences in the characteristics of students who attend different types of schools, including the stronger academic credentials of students at more selective colleges, but could also be due to the institutional resources more selective colleges can provide to support students in persisting.[60] This study explored, through descriptive analyses, some of the hypothesized benefits of enrolling in a more selective college and of college match, looking specifically at how initial college choices are related to longer-term persistence.

Exhibits C.26 and C.27 below show that after adjusting for student characteristics such as pre-college academic achievement, students who initially enrolled in more selective colleges were generally more likely to be enrolled continuously into their third year than were students who initially enrolled in less selective colleges. Differences between students enrolled in colleges with adjacent selectivity levels were often not statistically significant. However, there were differences of about 8 to 12 percentage points, in persistence rates for two-year versus four-

[59] Some, but not all of the research examining the relationship between college selectivity and persistence or completion accounts for students' pre-college characteristics, such as GPA, test scores, and advanced course-taking, that are also likely related to students' success in college.

[60] The difference in instructional expenditures between *most competitive* colleges and all other selectivity levels is stark: *most competitive* colleges spend an average of $34,000 per student, whereas *highly competitive* colleges spend an average of $16,000 and *very competitive* colleges an average of $11,000. Two-year colleges as well as *somewhat competitive* and *competitive* four-year colleges only spend about $7,000 to $9,000 per student (author's calculations using data from the NCES-Barron's Admissions Competitiveness Index and IPEDS).

year colleges, and for other four-year colleges (that is, *noncompetitive* or *unranked* four-year colleges) versus *somewhat competitive* colleges (Exhibit C.27 below). For example, there was no statistically significant difference in continuous enrollment for students enrolled in *most competitive* versus *highly competitive* colleges. However, there was a significant difference in continuous enrollment for students who attended *most competitive* colleges versus *competitive* colleges. There was also a significant difference for students enrolled in a *highly competitive* college, a *very competitive* college, or a *competitive* college versus those enrolled in an *any four-year* college, which includes *noncompetitive, specialty,* and *unranked* colleges.

Exhibit C.26 Persistence into the Third Fall after High School, by Selectivity of the College Attended in the First Fall

Selectivity Level	*N*	Adjusted Mean[a]	Upper CL	Lower CL
Most competitive	85	85.5	77.1	93.9
Highly competitive	147	80.0	73.6	86.4
Very competitive	446	77.6	73.7	81.5
Competitive	1,072	73.2	70.6	75.7
Somewhat competitive	324	73.9	69.6	78.3
Four-year college	295	62.1	57.6	66.6
Two-year college	909	54.6	51.9	57.3
Not enrolled	1,165	6.8	4.3	9.4
F-test of difference[b]		p = <.001		

CL is confidence limit for the 95 percent confidence interval. A confidence interval is a measure of the precision of the impact estimate. If an analysis was repeated many times with different students, the estimated impact would be expected to fall within the confidence interval 95 percent of the time.

[a] The "adjusted mean" refers to the model-adjusted mean percentage of students estimated from a regression model that includes the same set of student and project characteristics used in the impact analysis models (except for treatment status).

[b] *p*-Values shown in this row are for a test of whether adjusted means statistically differed across the selectivity levels in the rows above.

Notes: The outcome is continuous enrollment in any college between July 1, 2016, and October 1, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by October 1, 2018.

Sample Size: 4,443 students.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Exhibit C.27 Differences in Persistence into the Third Fall after High School, by Selectivity of the College Attended in the First Fall

Selectivity Level of College Attended in First Fall	Estimated Difference (95% Confidence Interval)[a]	Standard Error	*p*-Value
***Most competitive* compared to**			
Highly competitive	5.5 (-4.5, 15.6)	5.1	.279
Very competitive	7.9 (-0.9, 16.7)	4.5	.079
Competitive	12.3 (3.8, 20.9)	4.4	.005
Somewhat competitive	11.6 (2.3, 20.9)	4.7	.015
Other four-year college	23.4 (14.0, 32.8)	4.8	<.0001
Two-year college	30.9 (22.0, 39.7)	4.5	<.0001
Not enrolled	78.7 (69.8, 87.5)	4.5	<.0001
***Highly competitive* compared to**			
Very competitive	2.4 (-4.7, 9.4)	3.6	.509
Competitive	6.8 (0.2, 13.4)	3.4	.043
Somewhat competitive	6.0 (-1.5, 13.6)	3.8	.116
Other four-year college	17.9 (10.2, 25.5)	3.9	<.0001

Selectivity Level of College Attended in First Fall	Estimated Difference (95% Confidence Interval)[a]	Standard Error	*p*-Value
Two-year college	25.4 (18.5, 32.2)	3.5	<.0001
Not enrolled	73.1 (66.3, 80.0)	3.5	<.0001
***Very competitive* compared to**			
Competitive	4.4 (0.2, 8.7)	2.2	.041
Somewhat competitive	3.7 (-1.9, 9.2)	2.8	.197
Other four-year college	15.5 (9.8, 21.2)	2.9	<.0001
Two-year college	23.0 (18.4, 27.6)	2.4	<.0001
Not enrolled	70.7 (66.2, 75.2)	2.3	<.0001
***Competitive* compared to**			
Somewhat competitive	-0.8 (-5.5, 4.0)	2.4	.749
Other four-year college	11.1 (6.1, 16.0)	2.5	<.0001
Two-year college	18.5 (15.1, 22.0)	1.8	<.0001
Not enrolled	66.3 (63.0, 69.6)	1.7	<.0001
***Somewhat competitive* compared to**			
Other four-year college	11.8 (5.8, 17.9)	3.1	.000
Two-year college	19.3 (14.4, 24.2)	2.5	<.0001
Not enrolled	67.1 (62.3, 71.9)	2.4	<.0001
***Other four-year college* compared to**			
Two-year college	7.5 (2.4, 12.6)	2.6	.004
Not enrolled	55.3 (50.3, 60.2)	2.5	<.0001
***Two-year college* compared to**			
Not enrolled	47.8 (44.4, 51.1)	1.7	<.0001

[a] This column shows the difference in the percentage of students who are continuously enrolled in colleges at the specified selectivity levels. For example, the percentage of students continuously enrolled into the third year at *most competitive* colleges is 5.5 percentage points higher than at *highly competitive* colleges.
Notes: The outcome is continuous enrollment in any college between July 1, 2016, and October 1, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by October 1, 2018.
Sample Size: 4,443 students.
Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014; IPEDS 2015-16; APR 2014-15; college entrance exam score data 2015; baseline student survey 2015.

The study also examined whether being undermatched or overmatched is related to students' likelihood of persisting in college. Exhibit C.28 below suggests that, for students at all levels of academic achievement–highest, moderate, and lowest[61]–the likelihood of persisting in college was highest when they attended the most selective college possible, regardless of their match status. This was particularly true for lower-achieving students. Among these students, about two-thirds of those who overmatched were continuously enrolled into the third fall, compared to fewer than half of students with similar achievement who matched. For students with moderate academic achievement, their likelihood of persistence was about the same regardless of whether they were overmatched or matched. However, for these students, undermatching carried a particularly steep penalty: slightly more than half of students with moderate achievement levels who undermatched persisted into the third fall, compared to more than three-quarters of students in this group who attended a matched college. The highest-achieving students had a very high chance of persisting into the third fall regardless of the college they initially attended.

[61] Three academic achievement groups were created based on students' cumulative GPA, AP/IB course taking, and college entrance exam scores.

Exhibit C.28 Persistence into the Third Fall after High School, by Student Achievement and Undermatch Status

Academic Achievement, Status	*N*	Adjusted Mean[a]	Upper CL	Lower CL
Highest-Achieving Students				
Match	262	89.3	84.4	94.2
Undermatch	232	85.8	80.7	90.9
Moderate-Achieving Students				
Overmatch	232	81.5	76.4	86.6
Match	487	79.5	75.9	83.1
Undermatch	177	57.4	51.6	63.1
Lowest-Achieving Students				
Overmatch	1202	69.2	66.7	71.7
Match	686	48.5	45.5	51.6
F-test of difference[b]		p = <.001		

CL is confidence limit for the 95 percent confidence interval. A confidence interval is a measure of the precision of the impact estimate. If an analysis was repeated many times with different students, the estimated impact would be expected to fall within the confidence interval 95 percent of the time.

[a] The "adjusted mean" refers to the model-adjusted mean percentage of students estimated from a regression model that includes the same set of student and project characteristics used in the impact analysis models (except for treatment status).

[b] *p*-Values shown in this row are for a test of whether adjusted means statistically differed across the categories in all of the rows above.

Notes: The outcome is continuous enrollment in any college between July 1, 2016, and October 1, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by October 1, 2018.

Sample Size: 3,278 students who enrolled in college in the first fall after high school.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

Finally, the study examined whether enrolling in a familiar college—that is, students' Upward Bound host institution—was associated with persistence. Historically, a substantial share of students in Upward Bound end up attending the college that hosts their Upward Bound project.[62] However, these host colleges might or might not be a good academic fit for individual students. Although a lower percentage of students who enrolled in their host institution persisted into the third fall after high school than their peers who enrolled in less familiar colleges—that is, colleges other than their host institution—the difference was small in magnitude and not statistically significant (Exhibit C.29).

Exhibit C.29 Differences in Continuous Enrollment into the Third Fall after High School, by Whether Students Attended a Familiar College

	Attended a Familiar College (%)	Attended an Unfamiliar College (%)	Estimated Difference (95% Confidence Interval)	Standard Error	*p*-Value
Continuous enrollment into the third fall after high school	67.4	71.0	3.6 (-0.2, 5.5)	1.9	.062

Notes: The outcome is continuous enrollment in any college between July 1, 2016, and October 1, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by October1, 2018.

Sample Sizes: Attended a familiar college (their Upward Bound host institution) = 742 students, Attended an unfamiliar college (not their Upward Bound host institution) = 2,536 students.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015.

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[62] Martinez et al. 2018.

SECTION D. EFFECTS BY LEVEL OF FIND THE FIT IMPLEMENTATION

This section presents results from the exploratory analyses that examined whether the effect of *Find the Fit* varied by how much projects used *Find the Fit*. There were no significant differences in the effect of *Find the Fit* by level of implementation for any of the main outcome measures: undermatch (Exhibit D.1), selectivity level of the college attended (Exhibit D.2), or persistence into the third fall (Exhibit D.3 below). The lack of consistent differences across implementation levels could suggest that the implementation measures the study created mask important differences in how projects implemented *Find the Fit* or they could derive from the flexibility that Upward Bound projects had to use *Find the Fit* as they deemed best. [63]

Exhibit D.1 Effects on Undermatch, by Level of *Find the Fit* Implementation

	***Find the Fit* Group Students (%)**	**Regular UB Advising Group Students (%)**	**Estimated Impact (95% Confidence Interval)**	**Standard Error**	**p-Value[a]**
Low implementers	42.3	35.2	7.1 (-5.9, 20.1)	6.6	.284
Moderate implementers	37.7	39.9	-2.3 (-8.9, 4.37)	3.4	.504
High implementers	40.1	43.2	-3.1(-10.1, 3.9)	3.6	.388
F-test of difference[b]			*p* = .385		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the implementation category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the implementation categories in the rows above.
Notes: Percentage represents the share of students who undermatched in their college choice. *Find the Fit* group percentage and impact are estimated using the study's regression model. *Find the Fit* group projects were categorized as low implementers if they implemented less than 25 percent of any one *Find the Fit* component; moderate implementers if they implemented more than a quarter but not necessarily 75 percent of each component; and high implementers if they implemented 75 percent of more of each component.
Sample Sizes:
Low implementers: *Find the Fit* group = 262 students, Regular UB advising group = 230 students.
Moderate implementers: *Find the Fit* group = 1,235 students, Regular UB advising group = 859 students.
High implementers: *Find the Fit* group = 777 students, Regular UB advising group = 907 students.
Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015; project survey 2016; program monitoring data 2015-16.

Exhibit D.2 Effects on Selectivity Level of the College Attended, by Level of *Find the Fit* Implementation

	***Find the Fit* Group Students (%)**	**Regular UB Advising Group Students (%)**	**Estimated Impact (95% Confidence Interval)**	**Standard Error**	***p*-Value[a]**
Most Competitive					
Low implementers	3.2	2.1	1.1 (-2.1, 4.2)	1.6	.497
Moderate implementers	2.0	1.4	0.6 (-1.0, 2.2)	0.8	.454
High implementers	2.2	1.0	1.1 (-0.6, 2.8)	0.9	.183
F-test of difference[b]			*p* = .894		
At Least Highly Competitive					
Low implementers	6.7	4.7	2.0 (-4.2, 8.2)	3.2	.518
Moderate implementers	7.2	3.8	3.4 (0.2, 6.5)	1.6	.036
High implementers	6.5	3.5	3.0 (-0.3, 6.3)	1.7	.077
F-test of difference[b]			*p* = .934		

[63] Limited statistical power could also explain the lack of statistically significant findings.

	Find the Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact (95% Confidence Interval)	Standard Error	*p*-Value[a]
At Least Very Competitive					
Low implementers	14.5	14.9	-0.4 (-9.5, 8.7)	4.6	.937
Moderate implementers	15.5	14.4	1.1 (-3.5, 5.7)	2.3	.642
High implementers	17.7	11.4	6.3 (1.4, 11.2)	2.5	.012
F-test of difference[b]			*p* = .237		
At Least Competitive					
Low implementers	32.6	33.6	-1.0 (-14.0, 12.0)	6.6	.880
Moderate implementers	40.6	38.6	2.0 (-4.6, 8.6)	3.4	.555
High implementers	38.0	38.1	0.0 (-7.1, 7.0)	3.6	.991
F-test of difference[b]			*p* = .884		
At Least Somewhat Competitive					
Low implementers	35.1	41.7	-6.6 (-19.8, 6.7)	6.8	.331
Moderate implementers	49.2	44.5	4.7 (-2.0, 11.5)	3.4	.168
High implementers	46.3	44.1	2.2 (-4.9, 9.4)	3.6	.542
F-test of difference[b]			*p* = .335		
Any Four-Year College					
Low implementers	38.2	44.3	-6.0 (-18.2, 6.1)	6.2	.331
Moderate implementers	51.9	53.2	-1.3 (-7.4, 4.9)	3.1	.685
High implementers	50.6	50.6	-0.0 (-6.6, 6.4)	3.3	.996
F-test of difference[b]			*p* = .697		
Any College					
Low implementers	68.9	74.9	-6.0 (-16.8, 4.7)	5.5	.269
Moderate implementers	70.7	73.6	-2.8 (-8.2, 2.6)	2.7	.306
High implementers	70.7	69.7	1.0 (-4.7, 6.7)	2.9	.737
F-test of difference[b]			*p* = .445		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the implementation category in the row.
[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the implementation categories in the rows above.
Notes: Percentage represents the share of students who attended a college of at least a given selectivity level. For example, "at least *very competitive*" includes attending colleges at the two selectivity levels above that: *highly competitive* and *most competitive*. Differences were compared at each level by combining students who had attended colleges at that selectivity level and the levels above. *Find the Fit* group percentage and impact are estimated using the study's regression model. *Find the Fit* group projects were categorized as low implementers if they implemented less than 25 percent of any one *Find the Fit* component; moderate implementers if they implemented more than a quarter but not necessarily 75 percent of each component; and high implementers if they implemented 75 percent of more of each component.
Sample Sizes:

Low implementers: *Find the Fit* group = 267 students, Regular UB advising group = 235 students.

Moderate implementers: *Find the Fit* group = 1,267 students, Regular UB advising group = 919 students.

High implementers: *Find the Fit* group = 802 students, Regular UB advising group = 953 students.

Source: FSA 2017; NSC 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015; project survey 2016; program monitoring data 2015-16.

Exhibit D.3 Effects of *Find the Fit* on Persistence into the Third Fall after High School, by Level of *Find the Fit* Implementation

	Find the Fit Group Students (%)	Regular UB Advising Group Students (%)	Estimated Impact	Standard Error	*p*-Value[a]
Low implementers	50.1	51.5	-1.4 (-11.9, 9.1)	5.4	.794
Moderate implementers	52.5	50.7	1.8 (-3.4, 7.1)	2.7	.501
High implementers	50.9	46.9	4.0 (-1.6, 9.6)	2.9	.165
F-test of difference[b]			p = .657		

[a] *p*-Values shown in this column are for tests of whether there was a statistically significant impact for the implementation category in the row.

[b] *p*-Values shown in this row are for a test of whether impacts statistically differed between the implementation categories in the rows above.

Notes: The outcome is continuous enrollment in any college between July 1, 2016, and October 1, 2018, without an interruption in enrollment of five or more consecutive months, and/or graduation with any postsecondary degree or certificate by October 1, 2018. *Find the Fit* group percentage and impact are estimated using the study's regression model. *Find the Fit* group projects were categorized as low implementers if they implemented less than 25 percent of any one *Find the Fit* component; moderate implementers if they implemented more than a quarter but not necessarily 75 percent of each component; and high implementers if they implemented 75 percent of more of each component.

Sample Sizes:

Low implementers: *Find the Fit* group = 267 students, Regular UB advising group = 235 group students.

Moderate implementers: *Find the Fit* group = 1,267 students, Regular UB advising group = 919 students.

High implementers: *Find the Fit* group = 802 students, Regular UB advising group = 953 students.

Source: FSA 2017, 2018, 2019; NSC 2016, 2017, 2018; APR 2014-15; college entrance exam score data 2015; IPEDS 2015-16; baseline student survey 2015; project survey 2016; monitoring data 2015-16.

REFERENCES

Aronson, J., C. B. Fried, and C. Good. 2002. "Reducing the Effects of Stereotype Threat on African American College Students by Shaping Theories of Intelligence." *Journal of Experimental Social Psychology* 38 (2): 113-125.

Avery, C. 2013. *Evaluation of the College Possible Program: Results from a Randomized Controlled Trial.* NBER No. w19562. Cambridge, MA: National Bureau of Economic Research.

Bailey, M. J., and S. M. Dynarski. 2011. *Gains and Gaps: Changing Inequality in U.S. College Entry and Completion.* Education Policy Initiative Working Paper 05-2011. Ann Arbor, MI: Gerald R. Ford School of Public Policy. http://edpolicy.umich.edu/files/05-2011_gains-and-gaps.pdf.

Bound, J., M. F. Lovenheim, and S. Turner. 2010. "Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources." *American Economic Journal: Applied Economics* 2 (3): 129-157.

Bowen, W. G., M. M. Chingos, and M. S. McPherson. 2009. *Crossing the Finish Line: Completing College at America's Public Universities.* Princeton, NJ: Princeton University Press.

Cannon, R., and S. Goldrick-Rab. 2016. *Too Late? Too Little: The Timing of Financial Aid Applications*. Wisconsin HOPE Lab. https://www.luminafoundation.org/files/resources/too-late-too-little.pdf.

Castleman, B. L., and L. C. Page. 2015. "Summer Nudging: Can Personalized Text Messages and Peer Mentor Outreach Increase College Going among Low-Income High School Graduates?" *Journal of Economic Behavior & Organization* 115: 144-160.

Castleman, B. L., and L. C. Page. 2016. "Freshman Year Financial Aid Nudges: An Experiment to Increase FAFSA Renewal and College Persistence." *Journal of Human Resources* 51 (2): 389-415.

Castleman, B. L., S. Schwartz, and S. Baum. 2015. *Decision Making for Student Success: Behavioral Insights to Improve College Access and Persistence*. New York: Routledge.

Dillon, E. W., and J. A. Smith. 2020. "The Consequences of Academic Match between Students and Colleges." Journal of Human Resources 55 (3): 767-808.

Dundar, A., and D. Shapiro. 2016. *The National Student Clearinghouse as an Integral Part of the National Postsecondary Data Infrastructure*. Herndon, VA: National Student Clearinghouse Research Center.

Dynarski, S. M., S. W. Hemelt, and J. M. Hyman. 2015. "The Missing Manual: Using National Student Clearinghouse Data to Track Postsecondary Outcomes." *Educational Evaluation and Policy Analysis* 37 (1_suppl): 53S-79S.

Feeney, M., and J. Heroff. 2013. "Barriers to Need-Based Financial Aid: Predictors of Timely FAFSA Completion among Low-Income Students." *Journal of Student Financial Aid* 43 (2): 65-85.

Glazerman, S., A. Protik, B. Teh, J. Bruch, and J. Max. 2013. *Transfer Incentives for High-Performing Teachers: Final Results from a Multisite Randomized Experiment.* NCEE 2014-4003. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Horn, L., and C. D. Carroll. 2006. *Placing College Graduation Rates in Context: How 4-Year College Graduation Rates Vary with Selectivity and the Size of Low-Income Enrollment. Postsecondary Education Descriptive Analysis*

Report. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. http://nces.ed.gov/pubs2007/2007161.pdf.

Howell, J. S., and M. Pender. 2016. "The Costs and Benefits of Enrolling in an Academically Matched College." *Economics of Education Review* 51: 152-168.

Howell, J. S., M. Pender, and A. Kumar. 2016. "Academic Match and Fit: What Can We Learn from Stated Preferences, Student Actions, and Collegiate Outcomes?" In *Matching Students to Opportunity: Expanding College Choice, Access, and Quality,* edited by A. P. Kelly, J. S. Howell, and C. Sattin-Bajaj. Cambridge, MA: Harvard University Press.

Hoxby, C. 2001. "The Return of Attending a More Selective College: 1960 to the Present." In *Forum Futures: Exploring the Future of Higher Education, 2000 Papers*, edited by M. Devlin and J. Meyerson, 13-42. San Francisco: Jossey-Bass.

Hoxby, C., and S. Turner. 2013. *Expanding College Opportunities for High-Achieving, Low Income Students*. SIEPR Discussion Paper No. 12-014. Stanford, CA: Stanford Institute for Economic Policy Research.

Hurtado, S., V. B. Saenz, J. L. Santos, and N. L. Cabrera. 2008. *Advancing in Higher Education: A Portrait of Latina/o College Freshmen at Four-Year Institutions, 1975-2006*. Los Angeles: Higher Education Research Institute, University of California, Los Angeles.
https://www.heri.ucla.edu/PDFs/pubs/TFS/Special/Monographs/AdvancingInHigherEducation-LatinoTrends.pdf.

Judkins, D. R., and K. E. Porter. 2015. "Robustness of Ordinary Least Squares in Randomized Clinical Trials." *Statistics in Medicine* 20 (35): 1763-1773.

Karlan, D., M. McConnell, M. Mullainathan, and J. Zinman. 2010. *Getting to the Top of Mind: How Reminders Increase Saving*. NBER No. w16205. Cambridge, MA: National Bureau of Economic Research.

Kena, G., W. Hussar, J. McFarland, C. de Brey, L. Musu-Gillette, X. Wang, J. Zhang, A. Rathbun, S. Wilkinson-Flicker, M. Diliberti, A. Barmer, F. Bullock Mann, and E. Dunlop Velez. 2016. *The Condition of Education 2016*. NCES 2016-144. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Martinez, A., T. Linkow, H. Miller, and A. Parsad. 2018. *Study of Enhanced Advising in Upward Bound: Impacts on Steps Toward College*. NCEE 2019-4002. Washington, DC: National Center for Education Evaluation, Institute of Education Sciences, U.S. Department of Education.

Max, J., J. Constantine, J. Wellington, K. Hallgren, S. Glazerman, H. Chiang, and C. Speroni. 2014. *Evaluation of the Teacher Incentive Fund: Implementation and Early Impacts of Pay-for-Performance after One Year*. NCEE 2014-4019. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

National Student Clearinghouse. 2020. *National Student Clearinghouse Fact Sheet*.
https://studentclearinghouse.info/onestop/wp-content/uploads/NSCFactSheet.pdf

National Student Clearinghouse. 2021. Participating Enrollment Reporting Institutions. Retrieved from:
https://www.studentclearinghouse.org/colleges/enrollment-reporting/enrollment-reporting-institutions/

National Student Clearinghouse Research Center. 2014. *Using NSC StudentTracker for High Schools Reports: Considerations for Measuring the College Enrollment Rates of High School Graduates*. Herndon, VA: Author.
https://nscresearchcenter.org/wp-content/uploads/Considerations-in-Using-NSC-STHS-Reports.pdf.

National Student Clearinghouse Research Center. 2017. *Impact of Directory Information Blocks on StudentTracker Results*. Herndon, VA: Author. https://nscresearchcenter.org/wp-content/uploads/NSC_Directory_Block_Rates.pdf.

Page, L. C., Castleman, B., and Meyer, K. 2018. *Customized Nudging to Improve FAFSA Completion and Income Verification.* Available at SSRN: https://ssrn.com/abstract=2854345 or http://dx.doi.org/10.2139/ssrn.2854345.

Page, L. C., and J. E. Iriti. 2016. "On Undermatching and College Cost: A Case Study of the Pittsburgh Promise." In *Matching Students to Opportunity: Expanding College Choice, Access, and Quality*, edited by A. P. Kelly, J. S. Howell, and C. Sattin-Bajaj. Cambridge, MA: Harvard University Press.

Pallais, A. 2015. Small Differences that Matter: Mistakes in Applying to College. Journal of Labor Economics 33 (2): 493-520.

Puma, M. J., R. B. Olsen, S. H. Bell, and C. Price. 2009. *What to Do When Data Are Missing in Group Randomized Controlled Trials.* NCEE 2009-0049. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Roderick, M., V. Coca, V., and J. Nagaoka, J. 2011. "Potholes on the Road to College: High School Effects in Shaping Urban Students' Participation in College Application, Four-Year College Enrollment, and College Match." *Sociology of Education* 84 (3): 178-211.

Roderick, M., J. Nagaoka, V. Coca, E. Moeller, K. Roddie, J. Gilliam, and D. Patton. 2008. *From High School to the Future: Potholes on the Road to College.* Chicago, IL: The University of Chicago Consortium on Chicago School Research.

Schmitt, C. M. 2015. *Documentation for the Restricted-Use NCES-Barron's Admissions Competitiveness Index Data Files: 1972, 1982, 1992, 2004, 2008, and 2014*. NCES 2015-333. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Seftor, N. S., A. Mamun, and A. Schirm. 2009. *The Impacts of Regular Upward Bound on Postsecondary Outcomes Seven to Nine Years after Scheduled High School Graduation.* Princeton, NJ: Mathematica Policy Research. http://files.eric.ed.gov/fulltext/ED505850.pdf.

Smith, J. 2013. "Ova and Out: Using Twins to Estimate the Educational Returns to Attending a Selective College." *Economics of Education Review* 36: 166-180.

Smith, J., M. Pender, and J. Howell. 2013. "The Full Extent of Student-College Academic Undermatch." *Economics of Education Review* 32: 247-261.

U.S. Department of Education, Federal Student Aid. n.d. *About Us.* https://studentaid.ed.gov/sa/about.

Walton, G. M., and G. L. Cohen. 2011. "A Brief Social-Belonging Intervention Improves Academic and Health Outcomes of Minority Students." *Science* 331: 1447-1451.

Witteveen, D., and P. Attewell. 2017. "The Earnings Payoff from Attending a Selective College." *Social Science Research* 66: 154-169.

Yeager, D. S., R. Johnson, B. J. Spitzer, K. H. Trzesniewski, J. Powers, and C. S. Dweck. 2014. "The Far-Reaching Effects of Believing People Can Change: Implicit Theories of Personality Shape Stress, Health, and Achievement during Adolescence." *Journal of Personality and Social Psychology* 106: 867-884.