U.S. Department of Education
October 2018

Study of Enhanced College Advising in Upward Bound: Impacts on Steps Toward College APPENDICES

Alina Martinez
Mathematica Policy Research

Tamara Linkow
Hannah Miller
Amanda Parsad
Abt Associates

INSTITUTE OF EDUCATION SCIENCES

NATIONAL CENTER FOR EDUCATION EVALUATION AND REGIONAL ASSISTANCE

This page has been left blank for double–sided copying.

Study of Enhanced College Advising in Upward Bound: Impacts on Steps Toward College APPENDICES

October 2018

Alina Martinez
Mathematica Policy Research

Tamara Linkow
Hannah Miller
Amanda Parsad
Abt Associates

Marsha Silverberg
Project Officer
Institute of Education Sciences

NCEE 2019-4002
U.S. DEPARTMENT OF EDUCATION

ies NATIONAL CENTER FOR EDUCATION EVALUATION AND REGIONAL ASSISTANCE
Institute of Education Sciences

U.S. Department of Education

Betsy DeVos

Secretary

Institute of Education Sciences

Mark Schneider

Director

National Center for Education Evaluation and Regional Assistance

October 2018

This report was prepared for the Institute of Education Sciences under Contract ED-IES-12-C-0087. The project officer is Marsha Silverberg in the National Center for Education Evaluation and Regional Assistance.

IES evaluation reports present objective information on the conditions of implementation and impacts of the programs being evaluated. IES evaluation reports do not include conclusions or recommendations or views with regard to actions policymakers or practitioners should take in light of the findings in the report.

This report is in the public domain. Authorization to reproduce it in whole or in part is granted. While permission to reprint this publication is not necessary, the citation should read: Martinez, A., Linkow, T., Miller, H., & Parsad, A. (2018). *Study of Enhanced College Advising in Upward Bound: Impacts on Steps Toward College, Appendices* (NCEE 2019-4002). Washington, DC: National Center for Education Evaluation, Institute of Education Sciences, U.S. Department of Education.

This report is available on the Institute of Education Sciences website at http://ies.ed.gov/ncee.

Alternate Formats: Upon request, this report is available in alternate formats, such as Braille, large print, audiotape, or computer diskette. For more information, please contact the Department's Alternate Format Center at 202-260-9895 or 202-205-8113.

Appendix A: Additional Details of *Find the Fit* **1**
A.1 Underlying Research on Which *Find the Fit* Was Based 1
A.2 Details about *Find the Fit* Components 2
A.2.1 Student Materials 2
A.2.2 Messaging Program 3
A.2.3 Training Webinars for Advisors 5

Appendix B. Methodological Details **7**
B.1 Study Sample 7
B.1.1 Study Sample Is Similar to Upward Bound Population 7
B.1.2 Several Steps Occurred from Initial Recruited Sample to Creation of Analytic Samples 9
B.1.3 Random Assignment Was Conducted within Groups Based on Important Characteristics 10
B.1.4 Treatment and Control Groups Were Equivalent at Baseline 11
B.2 Data Sources and Measures 13
B.2.1 Interim Outcome Measures 13
B.2.2 Measures of *Find the Fit* Implementation and College Advising 16
B.2.3 Student and Project Characteristics 19
B.3 Analytic Methods 22
B.3.1 Overall Impacts 22
B.3.2 Impacts within Subgroup 23
B.3.3 Sensitivity Analyses 24
B.3.4 Variation by Implementation Levels 25
B.4 Power Analyses 25

Appendix C. Supplemental Information for Chapter 2 ..... **29**
C.1 Applied to Four or More Colleges 29
C.2 Selectivity Level of Colleges to Which Students Applied 31
C.3 Importance of Academic Quality in Choosing a College 38
C.4 Complete FAFSA by March 15 41

Appendix D. Supplemental Information for Chapter 3 ..... **43**

Exhibits

Exhibit A.1: Description of *Find the Fit* Content and Mapping to Challenges Addressed 3
Exhibit A.2: Sample Text Messages 4
Exhibit A.3: *Find the Fit* Programmed Messages 5
Exhibit B.1: Characteristics of Study Projects versus All Eligible Upward Bound Projects 7
Exhibit B.2: Characteristics of Students in Study Projects versus Students in All Eligible Upward Bound Projects 8
Exhibit B.3: Flow of Projects and Students from Recruitment to Analytic Samples 9
Exhibit B.4: Host Institution Type and Locale of Study Projects, by Random Assignment Status 10
Exhibit B.5: Characteristics of Study Projects, by Random Assignment Status 11
Exhibit B.6: Characteristics of Students in the Study, by Random Assignment Status 12
Exhibit B.7: Target Sample and Response Rate for Surveys 13
Exhibit B.8: Outcome Measures Construction and Percentage of Students Missing Data 14
Exhibit B.9: Baseline Equivalence in the Sample Used for Impact Analyses for Outcomes Constructed from Follow-Up Survey 16
Exhibit B.10: Implementation and College Advising Measures Construction and Missing Data 17
Exhibit B.11: Congruence between Annual Performance Report and Baseline Student Survey Data 19
Exhibit B.12: Student and Project Baseline Characteristics Construction and Missing Data 20
Exhibit B.13: Comparison of Design Assumptions and Actual Sample Statistics 26
Exhibit B.14: Achieved Minimum Detectable Effects for Overall Sample for Interim Outcomes and College Advising Measures 26
Exhibit B.15: Achieved Minimum Detectable Effects for Student and Project Subgroups for Three Interim Outcomes 27
Exhibit B.16: Achieved Minimum Detectable Effects for Student and Project Subgroups for Selectivity Level of Colleges to which Students Applied 28
Exhibit C.1: Impacts of *Find the Fit* on Whether Students Applied to Four or More Colleges, Overall and for Subgroups 29
Exhibit C.2: Sensitivity Analyses for Impact of *Find the Fit* on Whether Students Applied to Four or More Colleges 30
Exhibit C.3: Number of Colleges to which Students Reported Applying 30
Exhibit C.4: Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied 31
Exhibit C.5: Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied, by Student Subgroup 31
Exhibit C.6: Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied, by Project Subgroup 35
Exhibit C.7: Sensitivity Analyses for Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied 37
Exhibit C.8: Impact of *Find the Fit* on Whether Academic Quality was Somewhat Important or Very Important to Students in Choosing a College 38

Exhibit C.9: Impacts of *Find the Fit* on Whether Academic Quality was Very Important to Students in Choosing a College, Overall and for Subgroups 39

Exhibit C.10: Sensitivity Analyses for Impact of *Find the Fit* on Whether Academic Quality was Very Important to Students in Choosing a College 40

Exhibit C.11: Impacts of *Find the Fit* on Whether Students Completed the FAFSA by March 15, Overall and for Subgroups 41

Exhibit C.12: Sensitivity Analyses for Impact of *Find the Fit* on Whether Students Completed the FAFSA by March 15 42

Exhibit D.1: Treatment Group Projects' Reported Use of Each *Find the Fit* Material 43

Exhibit D.2: Impacts of *Find the Fit* on Three Interim Outcomes, by Project Implementation Category 44

Exhibit D.3: Impacts of *Find the Fit* on Selectivity Level of Colleges to which Students Applied, by Project Implementation Category 44

Appendix A: Additional Details of *Find the Fit*

This appendix outlines the research underlying *Find the Fit* and provides details about the three components of *Find the Fit*: student materials, messaging program, and training webinars for advisors. As discussed in Section 1.3 of the report, *Find the Fit* was intended to address three challenges that students may face related to the logistics of applying, financial hurdles and misperceptions about college costs, and limited expectations when applying to and selecting a college.

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

Find the Fit brought together promising strategies identified by previous research, including research on interventions that had undergone rigorous study but were tested with populations and in settings different from Upward Bound. Strategies from these interventions were combined into *Find the Fit*. This section describes the research that informed *Find the Fit* and 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—which included important 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 (Hoxby and Turner 2013). The information sent to students was extensive, and the study specifically targeted high-achieving students who were unlikely to be receiving much relevant college advising, and who would likely bear no cost if they attended a highly selective college because they likely would receive very generous financial aid packages. *Find the Fit* included materials adapted from that study—specifically individual items that wound up in *Find the Fit*'s student packets—to better reflect the Upward Bound population, which includes students who are much more diverse in their achievement and literacy levels, already receive college advising through the program, and may face a higher cost if they choose to attend more selective colleges.

Short activities to reduce students' fears of the unfamiliar. Psychologists have found that brief activities can reduce students' fears about fitting in or belonging in unfamiliar situations, and can also increase students' beliefs that intelligence and other personal attributes are malleable (Aronson, Fried, and Good 2002; Yeager et al. 2014). For example, students exposed to a two-part intervention—first reading about other students who initially felt 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 in a control group (Walton and Cohen 2011). This intervention was targeted at college freshmen to help them stay in college. With input from a principal investigator on that research team (Walton), an activity was adapted for *Find the Fit* to target high school students looking ahead to college and perhaps feeling anxious about the transition to a new and unfamiliar setting.

Semi-customized, real-time text messages. Several previous studies suggested that sending students semi-customized, real-time text messages can increase college enrollment, college persistence, and FAFSA completion for some groups of students, particularly those enrolling in or enrolled at two-year colleges, who have less access to college-planning supports, or who are not far along with their college planning at the completion of high school (Castleman and Page 2015; 2016; Page, Castleman, and Meyer 2016).

These studies sent messages that reminded students about pre-matriculation steps during the summer after high school graduation, encouraged college freshmen to refile their FAFSA for sophomore year, and connected students with support from counselors. The *Find the Fit* intervention modified the content of the text messages to be appropriate for the milestones that 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.

Concrete guidance on actionable steps. *Find the Fit* also incorporated key messages, which drew on studies as well as field best practices, to encourage students to:

- Apply to four or more colleges. Applying to more than one college significantly increases a student's likelihood of actually enrolling, as well as the selectivity of the college where the student enrolls (Pallais 2015; Smith 2013a). Of first-time, full-time freshmen who enroll in bachelor's degree-granting colleges, slightly more than 70 percent report that they applied to four or more colleges (Eagan et al. 2015). An emphasis was placed on having students apply to more selective colleges because of the relationship between the selectivity of college attended and education and career outcomes (Bound et al. 2010; Bowen et al. 2009; Dillon and Smith 2017; Horn and Carroll 2006; Howell and Pender 2016; Hoxby 2001; Smith 2013b; Witteveen and Attewell 2017).
- Complete the FAFSA by early spring of senior year. Completing the FAFSA early opens up the most opportunities for institutional and state aid (Cannon and Goldrick-Rab 2016; Feeney and Heroff 2013); it also gives students accurate information about real costs before they must make a decision about which school to attend.
- Examine student outcomes at different colleges to which they are likely admissible. Providing guidance on selecting colleges that have high graduation rates and are a match with students' academic qualifications is important to increasing students' chances of completing a four-year degree (Roderick et al. 2008).

Previous research suggests that low-income students often have limited access to information about the importance of the steps above (Bowen et al. 2009), yet providing students with this type of guidance can result in higher rates of enrollment in selective, four-year colleges and in enrollment shifts from two-year colleges to four-year colleges (Avery 2013).

A.2 Details about *Find the Fit* Components

A.2.1 Student Materials

The *Find the Fit* student materials consisted of 13 handouts and activities packaged in a personalized student folder for each rising senior at treatment group Upward Bound projects. Exhibit A.1 includes a description of *Find the Fit* and maps its content to the three key challenges—logistics of applying, financial hurdles, and limited expectations—that many low-income students and first-generation college goers face in finding and enrolling in a college that is a good fit for them.

Folders were mailed to the projects in June 2015, the summer after students' junior year; projects were asked to distribute the folders to their students. Projects also received copies of a letter and parent-focused timeline that they could distribute to share *Find the Fit* information with parents.

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

Component	Content	Challenge(s) Addressed
Student Materials	*Shuffle, Sort and Stack* activity to prompt thinking about a variety of factors, and which students value, in considering colleges	E
	Four Factors of Fit handout to promote thinking about a variety of factors, including academic quality, in considering colleges	L, E
	College Application Timeline Reminders sheet of key steps in the college application process, including financial aid applications	L, F
	My College Planner booklet to track steps in the college application process	L, F
	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 range in net costs, show variation in institutional quality, and counter misinformation about college costs	F
	Scholarships and Grants guide that emphasizes the importance of searching for a wide range of scholarships and grants to minimize financial burden	F
	My College Search tracking sheet to record key factors about colleges being considered	L, E
	Break Beyond the Familiar adaptive mindset video and activity to encourage students to recognize their own ability to learn and grow in unfamiliar environments	E
	Discover Campus Support Services activity to identify support services and staff available at colleges of interest	E
	Start Your 2+2 Planning guide for planning transfer to a four-year college for those starting at a community college	E
	The Common Application information sheet to facilitate completion of the Common Application	L
	College Admission Application Fee Waivers information sheet about waivers of college application fees	F
	National Association for College Admission Counseling (*NACAC) Request for Admission Application Fee Waiver* form to facilitate submission of request for waiver of college application fee	E, F
Messages to Students	Real-time customized reminders to not miss key application and pre-enrollment deadlines	L
	Prompts to complete the FAFSA early; links to resources to find scholarships	F
	Prompts to explore a variety of colleges	E
	Reminders to use *Find the Fit* materials	L, F, E
Advisor Training Webinars	Review of emerging research and promising practices, including consequences of academic undermatch and benefits to enhancing social belonging and developing a growth mindset	L, F, E
	Training on use of *Find the Fit* student materials and text messaging	L, F, E

Key: L = logistics of applying; F = financial hurdles; E = limited expectations.

A.2.2 Messaging Program

Find the Fit included a series of programmed messages sent to treatment group Upward Bound students to remind them about key steps in the college search, application, and enrollment processes. The messages were sent via a web-based text messaging platform provided by the vendor Signal Vine. Treatment group projects received a Signal Vine account free of charge as part of their participation in *Find the Fit*. 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 numbers were unavailable, students were sent the messages through email instead.

The messages began at the end of students' junior year and continued until the end of students' senior year, or through the summer after students' high school graduation for students in the 65 treatment projects with a summer bridge program. The messages were automatically sent out at important time points (e.g., prior to college application due dates); students received about two programmed messages per month. Message content was adapted from previous text message programs (e.g., Castleman and Page 2015; 2016).

Exhibit A.2 provides a sample of the messages sent to students. The semi-customized nature of the platform allowed the messages to include each student's first name, advisor's name, and information specific to the student's college plans. For example, students who provided a list of colleges they planned to apply to (either through the baseline student survey in spring 2015 or in response to the October 2015 programmed message asking them about their application plans) were automatically sent deadline reminders several weeks before each college's application was due. 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 certain messages.

Exhibit A.2: Sample Text Messages

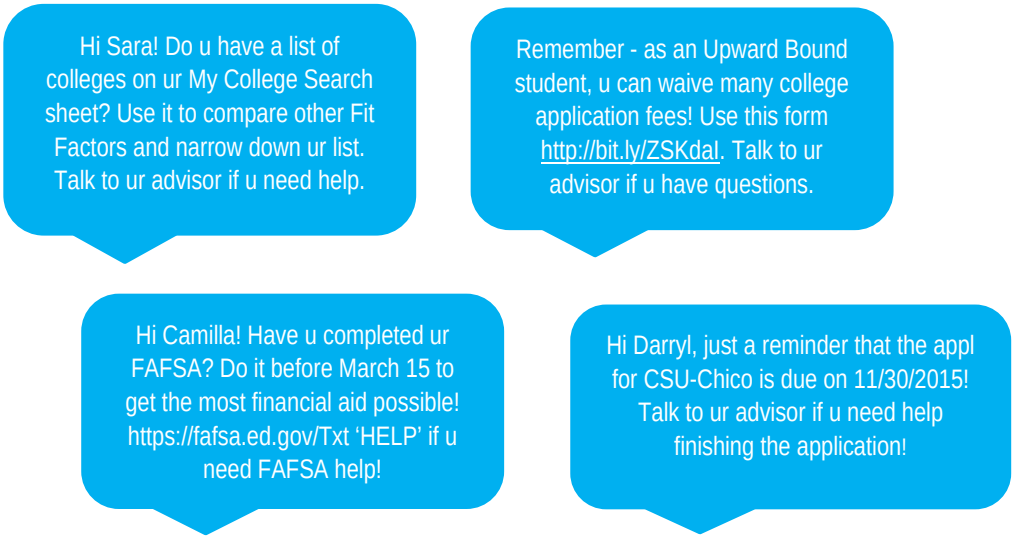


Exhibit A.3: *Find the Fit* Programmed Messages

Time Frame	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	
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 projects without a summer bridge program.

A.2.3 Training Webinars for Advisors

Find the Fit included three live webinar trainings for Upward Bound advisors in treatment projects; all staff who provided college advising to rising seniors in the projects were encouraged to attend. Each webinar was about 1 to 1.5 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 academic match and college cost, thereby enabling students to make wise choices about where to apply and ultimately attend college. 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' outcomes; and demonstrated how advisors could use some of the *Find the Fit* student materials.

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 (e.g., virtual tours, TRIO Student Support Services programs).

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.

Appendix B. Methodological Details

This appendix provides additional details on the study sample, data sources and measures, analytic methods, and power analyses to complement the information provided in Chapter 1, Section 1.4.

B.1 Study Sample

B.1.1 Study Sample Is Similar to Upward Bound Population

As described in Section 1.4.2, the study sample consisted of 194 Upward Bound projects, whose characteristics were similar to those of the population of eligible Upward Bound projects (Exhibit B.1).

Exhibit B.1: 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 Institution Host		
Yes	22.2	28.2
No	77.8	71.8
Project Size	(Mean)	(Mean)
Number of students	73.1	73.2

Note: Sample = 194 Upward Bound projects in the study and 702 total Upward Bound projects.

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

The 4,443 students in the study were also similar to the population of students in all eligible Upward Bound projects (Exhibit B.2).[1]

Exhibit B.2: 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		
Male	36.0	36.0
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 Characteristics		
Low-income household	87.6	88.1
First generation to college	91.7	92.2
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
High School Course Taking		
Taken one or more AP/IB course	34.4	33.4
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]

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.

Note: Sample = 4,443 students in study projects and 18,487 same-grade students in all eligible Upward Bound projects.

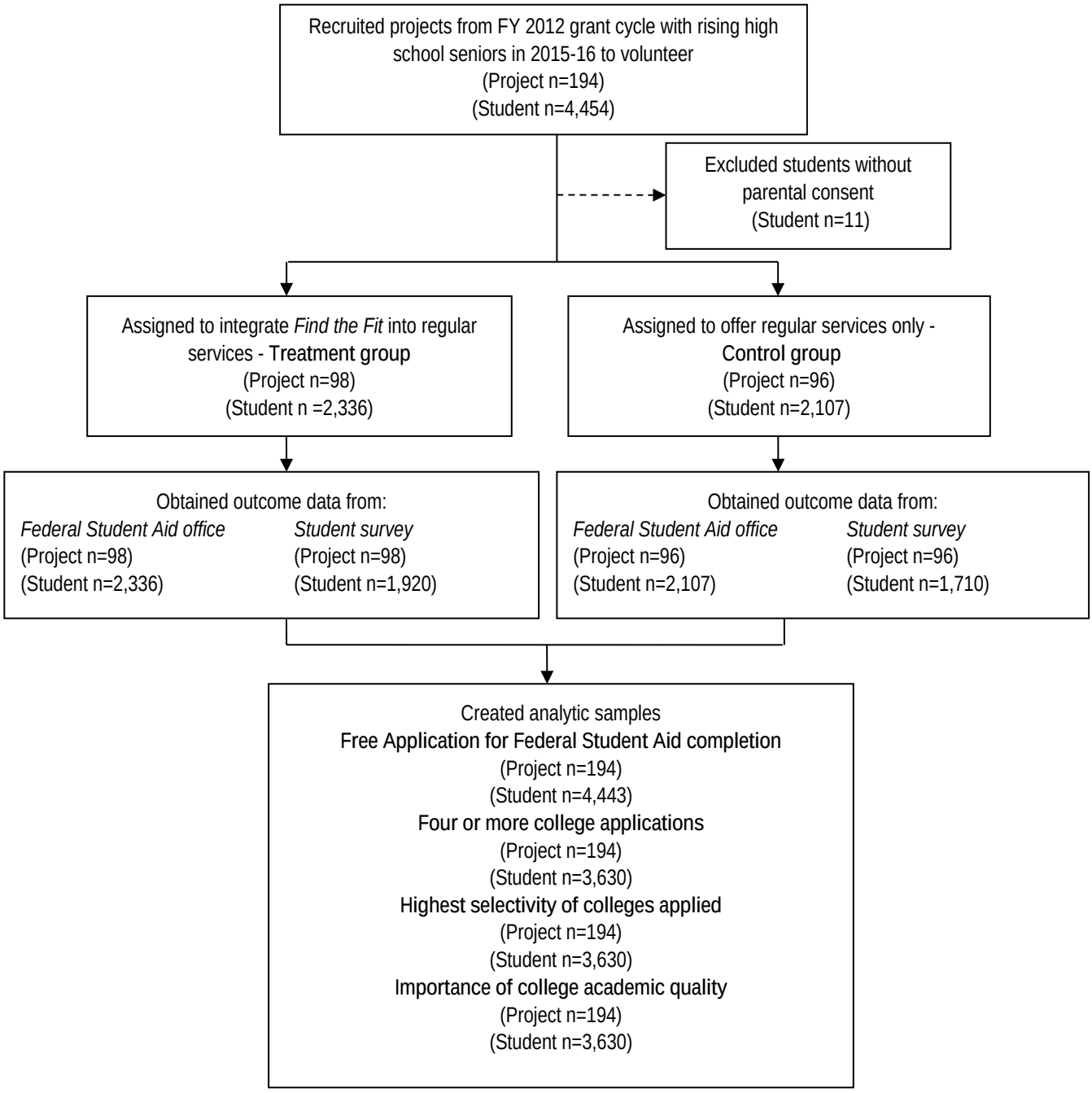
Source: APR 2012-13 to 2014-15; college entrance exam data 2015.

[1] An additional 11 students were served by the projects in the study but were not included in the study because their parents opted to exclude them from the study prior to random assignment; 6 of these students were in projects later assigned to the treatment group and 5 were in projects later assigned to the control group.

B.1.2 Several Steps Occurred from Initial Recruited Sample to Creation of Analytic Samples

Exhibit B.3 diagrams the flow of study participants from the recruited sample to the analytic samples for the outcomes investigated in this report.

Exhibit B.3: Flow of Projects and Students from Recruitment to Analytic Samples



B.1.3 Random Assignment Was Conducted within Groups Based on Important Characteristics

In spring 2015, after the 194 Upward Bound projects and their 4,443 students had been identified and recruited, the projects were randomly assigned. The projects were first divided into blocks—created by the combination of their host institution type (four-year or not) and their geographic locale (city, suburb, town, or rural). Then within each of these eight blocks, projects were randomly assigned to either the treatment or the control group. Blocks were used both to prevent a bad draw by chance (e.g., more treatment group projects in urban settings than control group projects) and to enhance the study's ability to examine impacts of *Find the Fit* for key subgroups of Upward Bound projects.

Randomization within these blocks, coupled with analytic models that include terms for the blocks, means that treatment-control comparisons are made within host institution type and locale, and that the overall impact is a precision-weighted mean of the within-block impact estimates. This ensures, for example, that outcomes for treatment projects hosted by two-year colleges located in urban settings are compared with outcomes for control projects with the same type of host institution and locale.

Because some of the eight randomization blocks had odd numbers of projects, there were two blocks where randomization resulted in having more treatment than control projects within the block. Exhibit B.4 displays the number of treatment and control projects in each randomization block.

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

Randomization Block	Treatment Group Projects (N)	Control 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

Note: Sample = 98 treatment group projects and 96 control group projects.

Source: IPEDS 2015-16.

As part of the recruitment strategy, projects that volunteered were all promised the opportunity to receive *Find the Fit*, though in two different "waves" determined randomly. Only projects assigned to Wave 1 (the treatment group) had access to *Find the Fit* to integrate into their regular Upward Bound services for their 2015-16 seniors during the 2015-16 school year (the study period). Projects in Wave 2 (the control group) continued to provide their regular services to Upward Bound students without access to *Find the Fit*; these projects received access to *Find the Fit* only after seniors in that year had left Upward Bound and the study concluded; this allowed them to use *Find the Fit* with subsequent cohorts of students, if desired. Thus, there is little possibility that students in control projects experienced *Find the Fit* during the study period.

During the study period, students in both treatment and control group projects continued to receive Upward Bound's existing services (e.g., college application assistance, course-taking guidance, counseling on applying for financial aid) as described in Exhibit 1.2.

B.1.4 Treatment and Control Groups Were Equivalent at Baseline

There were no statistically significant differences between treatment group and control group projects on any of the project characteristics the study examined (Exhibit B.5). The percentages of projects hosted by four-year colleges, two-year colleges, and institutions other than colleges were similar for treatment and control group projects, as were the percentages of projects located in the different locales (e.g., cities, towns) and in each region of the United States.

The largest difference between treatment and control group projects was that treatment group projects were 9 percentage points more likely to be hosted by a minority-serving institution; however, this difference was not statistically significant.

Exhibit B.5: Characteristics of Study Projects, by Random Assignment Status

Project Characteristic	Treatment Group Projects (%)	Control Group Projects (%)	Estimated Difference	*p*-value
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 Institution Host				
Yes	26.5	17.7	8.8	.141
No	73.5	82.3	–8.8	.141
Project Size	(Mean)	(Mean)		
Number of students	76.0	70.1	5.9	.089

Note: Sample = 98 treatment group projects and 96 control group projects.

Source: IPEDS 2015-16.

Across the 194 projects, 4,443 students participated in the study: 2,336 students from treatment group projects and 2,107 students from control group projects. There were no statistically significant differences between treatment and control group students on any of the baseline characteristics used as covariates in the impact analyses (Exhibit B.6). Some 64 percent of both treatment and control group students were female; 39 percent were Black, non-Hispanic; and 88 percent were from a low-income household. About one-third of both treatment and control group students had taken one or more AP or IB courses, and their average unweighted cumulative GPAs were similar: 3.1 for treatment group students and 3.0 for control group students.

Additional information on baseline equivalence for the analytic samples used for impact analyses is presented in Section B.2.1 (Exhibit B.9).

Exhibit B.6: Characteristics of Students in the Study, by Random Assignment Status

Student Characteristic	Treatment Group Students (%)	Control Group Students (%)	Estimated Difference	*p*-value
Gender				
Male	35.6	36.2	-0.6	.721
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	3.1 (GPA)	3.0 (GPA)	0.0	.571
College entrance exam	874.3 (SAT score)	862.4 (SAT score)	11.8	.323

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

Notes: Sample = 2,318 treatment group students and 2,102 control group students for gender, 2,311 treatment group students and 2,099 control group students for race/ethnicity, 2,310 treatment group students and 2,088 control group students for low-income household, 2,317 treatment group students and 2,101 control group students for first generation to college, 2,305 treatment group students and 2,085 control group students for taken AP/IB courses, 1,969 treatment group students and 1,855 control group students for unweighted cumulative GPA, and 1,745 treatment group students and 1,499 control group students for college entrance exam. The treatment group percentage and estimated difference are adjusted for the blocked random assignment design and the clustering of students within Upward Bound projects.

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

B.2 Data Sources and Measures

Section 1.4.4 describes the data sources used in the study. Exhibit B.7 presents the response rates for each of the study surveys. The study began following students in spring 2015 (at the end of their junior year of high school and when they completed the baseline survey) through their senior year in 2015-16, during which time the treatment group projects had access to *Find the Fit*. College-going outcomes will be measured in the first two years after students' expected high school graduation (2016-17, 2017-18).

Exhibit B.7: Target Sample and Response Rate for Surveys

Study Survey	Target Sample	Response Rate (%)		
		Overall	Treatment	Control
Baseline student survey (pre-*Find the Fit*)	4,443 students	80.6	80.6	80.7
Follow-up student survey	4,443 students	81.7	82.2	81.2
Project survey[a]	194 project directors	94.8	95.9	93.8

[a] 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.

B.2.1 Interim Outcome Measures

Exhibit 1.9, in Chapter 1, defines each outcome measure and lists the data source used to construct it. Exhibit B.8 provides information on how each outcome was constructed, as well as missing data rates for each. Three of the four outcome measures—whether students applied to four or more colleges, the selectivity levels of the colleges to which students applied, and the importance students place on academic quality—were constructed from items in the follow-up student survey, which was completed by more than 80 percent of both treatment and control group students.

The fourth outcome, FAFSA completion by March 15, came from Federal Student Aid (FSA) office records. There were no missing data on the outcome of FAFSA completion because students who did not have a record at FSA are assumed to not have completed the FAFSA; thus, the sample used for impact analyses for that outcome was the full sample.

Exhibit B.8: Outcome Measures Construction and Percentage of Students Missing Data

Outcome	Construction	Percentage of Students Missing Data	
		Treatment Group	Control Group
Applied to four or more colleges	1 = Student lists four or more colleges when asked the specific colleges s/he applied to 0 = Student lists three or fewer colleges when asked the specific colleges s/he applied to	17.8	18.8
Selectivity level of colleges to which student applied			
Most competitive	1 = At least one of the colleges the student reports having applied to has a Barron's selectivity level of "most competitive" 0 = None of the colleges the student reports having applied to has a Barron's selectivity level of "most competitive," or student does not report having applied to any college	17.8	18.8
At least highly competitive	1 = At least one of the colleges student reports having applied to has a Barron's selectivity level of "highly competitive" or higher 0 = None of the colleges student reports having applied to has a Barron's selectivity level of "highly competitive" or higher, or student does not report having applied to any college	17.8	18.8
At least very competitive	1 = At least one of the colleges the student reports having applied to has a Barron's selectivity level of "very competitive" or higher 0 = None of the colleges student reports having applied to has a Barron's selectivity level of "very competitive" or higher, or student does not report having applied to any college	17.8	18.8
At least competitive	1 = At least one of the colleges the student reports having applied to has a Barron's selectivity level of "competitive" or higher 0 = None of the colleges student reports having applied to has a Barron's selectivity level of "competitive" or higher, or student does not report having applied to any college	17.8	18.8
At least somewhat competitive	1 = At least one of the colleges the student reports having applied to has a Barron's selectivity level of "somewhat competitive" or higher 0 = None of the colleges student reports having applied to has a Barron's selectivity level of "somewhat competitive" or higher, or the student does not report having applied to any college	17.8	18.8
Any four-year college	1 = At least one of the colleges the student reports having applied to is a four-year college 0 = None of the colleges the student reports having applied to is a four-year college, or student does not report having applied to any college	17.8	18.8

Outcome	Construction	Percentage of Students Missing Data	
		Treatment Group	Control Group
Any college	1 = Student lists at least one college s/he has applied to 0 = Student does not list any college s/he has applied to	17.8	18.8
Importance placed on college academic quality	1 = Student rates academic quality or reputation as "very important" in choosing a college to attend after high school 0 = Student does not rate academic quality or reputation as "very important"	17.8	18.8
Completed FAFSA by March 15	1 = FAFSA completed and accepted by March 15, 2016 0 = FAFSA not completed and accepted by March 15, 2016	0.0	0.0

Note: Sample = 2,336 treatment group students and 2,107 control group students.

Source: FSA 2016; follow-up student survey 2016; NCES-Barron's Admissions Competitiveness Index 2014.

Similarly, there were no statistically significant differences between the treatment and control group students used to analyze the impact of *Find the Fit* on the three outcomes constructed from the follow-up survey (Exhibit B.9).

Exhibit B.9: Baseline Equivalence in the Sample Used for Impact Analyses for Outcomes Constructed from Follow-Up Survey

Student Characteristic	Treatment Group Students (%)	Control Group Students (%)	Estimated Difference	*p*-value
Gender				
Male	34.1	35.4	-1.3	.439
Female	65.9	64.6	1.3	.439
Race/Ethnicity				
Hispanic	27.7	23.5	4.2	.353
White, non-Hispanic	23.0	26.1	–3.0	.454
Black, non-Hispanic	36.4	36.7	–0.4	.945
Other, non-Hispanic	12.9	13.7	–0.9	.774
Household Characteristics				
Low-income household	87.3	86.5	0.8	.594
First generation to college	91.0	92.0	–0.9	.438
Academic Characteristics				
Taken one or more AP/IB courses	38.5	33.8	4.6	.229
Unweighted cumulative GPA	3.1 (GPA)	3.1 (GPA)	0.0	.601
College entrance exam	882.7 (SAT score)	873.1 (SAT score)	9.6	.435

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

Note: Sample = 1,913 treatment group students and 1,707 control group students for gender, 1,909 treatment group students and 1,704 control group students for race/ethnicity, 1,905 treatment group students and 1,694 control group students for low-income household, 1,912 treatment group students and 1,706 control group students for first generation to college, 1,900 treatment group students and 1,691 control group students for taken AP/IB courses, 1,623 treatment group students and 1,501 control group students for unweighted cumulative GPA, and 1,451 treatment group students and 1,213 control group students for college entrance exam. The outcomes constructed from the survey are Applied to Four or More Colleges, Selectivity Level of Colleges to Which Students Applied, and Importance of Academic Quality. Treatment 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.12 for additional details on missing baseline data.

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

B.2.2 Measures of *Find the Fit* Implementation and College Advising

Exhibit 1.10, in Chapter 1, describes the measures used to characterize the implementation of *Find the Fit* in treatment group projects, as well as the college advising that treatment and control group students received from their Upward Bound project. Exhibit B.10 provides additional detail on how these measures were constructed and on rates of missing data for each. Though the college advising measures were collected from both treatment and control group students, the implementation measures were relevant only for treatment group projects.

Exhibit B.10: Implementation and College Advising Measures Construction and Missing Data

Measure	Construction	Percentage of Students Missing Data	
		Treatment Group	Control Group
Implementation of *Find the Fit*			
Use of student materials[a]	1 = Treatment group project reports using particular material (e.g., My College Planner) with 2015-16 seniors 0 = Treatment group project does not report using particular material with 2015-16 seniors	4.1[a]	n/a
Number of student materials used[a]	Number of *Find the Fit* materials treatment group project reports using with 2015-16 seniors	4.1[a]	n/a
Number of students sent messages[a]	Number of 2015-16 seniors in the treatment group project who were sent any *Find the Fit* text or email messages	0.0[a]	n/a
Date through which students were sent messages[a]	Period through which student was sent messages, calculated using dates on which student was sent programmed text messages or email messages	0.0 [a]	n/a
Number of webinars attended[a]	Number of training webinars attended by any staff from the treatment group project	0.0[a]	n/a
College Advising Received by Students			
Encouraged student to consider net cost	1 = Student reports Upward Bound staff encouraged him/her to consider the cost of college after scholarships, grants, and financial aid are taken into account "a lot" in deciding where to apply to college 0 = Student does not report Upward Bound staff encouraged him/her to consider this factor "a lot"	18.2	19.2
Encouraged student to consider college match	1 = Student reports Upward Bound staff encouraged him/her to consider how well his/her entrance exam scores and GPA match with average student entrance exam scores and GPA at the college "a lot" in deciding where to apply to college 0 = Student does not report Upward Bound staff encouraged him/her to consider this factor "a lot"	22.3	22.8
Encouraged student to consider graduation/employment rates	1 = Student reports Upward Bound staff encouraged him/her to consider the college's graduation rate or employment rate "a lot" in deciding where to apply to college 0 = Student does not report Upward Bound staff encouraged him/her to consider this factor "a lot"	22.1	22.7
Encouraged student to think about ability to adapt to college	1 = Student reports Upward Bound staff encouraged him/her to consider his/her ability to adjust to the social and academic challenges of college "a lot" in deciding where to apply to college 0 = Student does not report Upward Bound staff encouraged him/her to consider this factor "a lot"	18.8	19.4
Discussed all six milestones with advisor	1 = Student reports Upward Bound staff discussed each of the following milestones with him/her: (1) how to choose colleges to apply to, (2) admissions requirements for different colleges, (3) timelines for applying to college, (4) ways to prepare for the SAT/ACT, (5) how to complete the Common Application, (6) how to complete the FAFSA 0 = Student does not report Upward Bound staff discussed each milestone with him/her	19.1	20.0

Measure	Construction	Percentage of Students Missing Data	
		Treatment Group	Control Group
Encouraged student to apply to four or more colleges	1 = Student reports Upward Bound staff recommended s/he apply to a certain number of colleges, and that number was four or more 0 = Student does not report Upward Bound staff recommended s/he apply to four or more colleges	24.1	24.4
Encouraged student to complete the FAFSA by March 15	1 = Student reports Upward Bound staff encouraged him/her to complete the FAFSA by a certain date, and that date was March 15 of his/her senior year or earlier 0 = Student does not report Upward Bound staff encouraged him/her to complete the FAFSA by March 15	18.5	19.5

[a] Because these are measures of implementation of *Find the Fit*, they are relevant only for the treatment group.

Note: Sample = 98 treatment group projects and 2,336 treatment group students for *Find the Fit* implementation measures, and 2,336 treatment group students and 2,107 control group students for measures of college advising.

Source: Project survey 2016; follow-up student survey 2016; intervention monitoring data 2015-16.

B.2.3 Student and Project Characteristics

The characteristics of the students and Upward Bound projects that participated in this study are described throughout the report. The specific characteristics used to describe participating students are: gender, race/ethnicity, first generation to college, low-income household, college entrance exam score, GPA, and AP/IB course taking. Measures for most of these characteristics come from the 2015 Annual Performance Report (APR) data, which were submitted by Upward Bound projects to the program office and contained data for every student who entered the project. When missing from the APR, data were taken from the baseline student survey for some characteristics: gender, race/ethnicity, and first generation to college. 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 was substituted if SAT and ACT scores were not available).

Fortunately, data from the APR and the baseline student survey were very well aligned. Exhibit B.11 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 surveys, the data matched for 89 to 98 percent of students.

Exhibit B.11: Congruence between Annual Performance Report and Baseline Student Survey Data

Measure	Percentage of Students Missing Data			Number of Students in Both Sources	Percentage Congruent
	APR	Baseline Survey	Both		
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: Sample = 4,443 students for percentage missing; 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.

Source: APR 2014-15; baseline student survey 2015.

Exhibit B.12 shows the data source, variable coding, and percentage of missing data for each of the student characteristics used in the analytic models, as well as for the two project characteristics that are used—host institution type and locale.

Exhibit B.12: Student and Project Baseline Characteristics Construction and Missing Data

Measure	Data Source	Coding	Percentage of Students Missing Data	
			Treatment Group	Control Group
Baseline Student Characteristic				
Gender	APR; baseline student survey	1 = Female 0 = Male	0.8	0.2
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
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
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
GPA	APR	Unweighted grade point average	15.7	12.0
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
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
Baseline Project Characteristic				
Host institution type	IPEDS	Three categories: 3 = Four-year college 2 = Two-year college 1 = Other	0.0	0.0
Locale	IPEDS	Four categories: 1 = City 2 = Suburb 3 = Town 4 = Rural	0.0	0.0

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

Note: Sample = 2,336 treatment group students and 2,107 control group students for student characteristics, and 98 treatment group projects and 96 control group projects for project characteristics.

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

All seven student characteristics are used as covariates in the analytic models to take into account possible existing variation between students in the treatment and control group projects. The analytic models also account for host institution type and locale via the randomization blocks discussed in B.1.3. Several of these student and project characteristics are also used to define subgroups of policy and program interest based on the rationale described in Exhibit 1.11.

For subgroup analyses based on students' college entrance exam scores, students' scores were coded into four categories based on quartiles from the nationally representative Education Longitudinal Study of 2002, providing a point of reference for these scores beyond the study sample. Scores for the quartiles were 400–850, 860–980, 990–1130, and 1140–1600.

B.3 Analytic Methods

B.3.1 Overall Impacts

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).[2] The level-1 models include the seven baseline student characteristics described above as covariates, and the level-2 models include indicators for treatment status and randomization block.

A two-level linear regression model was estimated for each interim outcome, as well as for student reports of college advising in Upward Bound. Although all of the outcomes are binary, linear models with conventional standard errors were used instead of non-linear models (e.g., logit models). This approach was motivated by the following: linear models are simpler to estimate and to interpret, yield unbiased estimates of the intervention impact, yield standard error estimates that are approximately correct even when the underlying data-generating process is nonlinear (Judkins and Porter 2015), and have been used by many random assignment evaluations in education.[3]

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

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

where i indexes students and j indexes projects. Y_{ij} is the value of the outcome (e.g., FAFSA completion by March 15) for the i^{th} student in the j^{th} Upward Bound project; β_{0j} is the covariate-adjusted mean value[4] of the outcome in project j; $BaselineStudentCharacteristics_{ij}$ is a set of student baseline characteristics;

---

[2] Standard regression models typically used to estimate impacts assume every student is independent of every other student in the sample. However, because students were grouped within Upward Bound projects in this study, there are bound to be commonalities or interdependence for students from the same project.

[3] Examples include the evaluation of the Teacher Incentive Fund (Max et al. 2014) and the evaluation of the Talent Transfer Initiative (Glazerman, Protik, Teh, Bruch, and Max 2013).

[4] Mean values for binary variables are proportions. For example, if Y_{ij} has a value of 1 for students who applied to four or more colleges and a 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 applied to four or more colleges. In other words, a mean of 0.48 indicates that 48 percent of students in project j applied to four or more colleges (.48 x 100 = 48).

β_{aj} represents the effects of the baseline student characteristics on the outcome; and ε_{ij} is random error, assumed to be identically and independently distributed.

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

(2) $\beta_{0j} = \gamma_{00} + \gamma_{01} Treatment_j + \sum_{n=2}^{8} \gamma_{0n} (RA_Blocks_{nj}) + \mu_{oj}$

where $Treatment_j$ equals 1 for the treatment group and 0 for the control group and RA_Blocks_{nj} includes seven dummy variables representing the eight randomization blocks. The impact 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 the treatment group and the proportion of students in the control group, who had a value of 1 for the outcome variable – for example, students who applied to four or more colleges. 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 x 100 = 9.2), indicating that the percentage of students in the treatment group who apply to four or more colleges is 9.2 percentage points higher than the percentage in the control group. To test for impacts (i.e., testing the null hypothesis that $\gamma_{01}$is zero), the study conducted two-tailed *t*-tests at the 5 percent level.

B.3.2 Impacts within Subgroup

In addition to examining the *average* impacts of *Find the Fit* on student outcomes and student reports of college advising, the study also investigated the impact of the intervention within subgroups defined by student and project characteristics. 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 were reported; for example, impact estimates were reported for both male and female students, and the result of a test of whether the magnitude of impact for male students was different from the magnitude of impact for female students was also reported.

All tests were two-tailed tests and used an alpha-level criterion of $p < .05$. Because the study was designed to detect impacts for the full sample, and not to detect differences in impacts between subgroups, a difference in impacts between subgroups is likely only to be detected when the true difference is large. 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 we might expect to detect at least eight significant differences across the 160 tests conducted (10 outcomes and 16 subgroup categories).

Casewise deletion was used for missing data on outcome measures, whereas the dummy variable method[5] was used to address missing values for baseline student characteristics. These methods are consistent with the recommendations in the IES technical methods report *What to Do When Data Are Missing in Group Randomized Controlled Trials* (Puma et al. 2009) and allowable under standards of the What Works Clearinghouse™.

[5] The dummy variable method involves substituting a constant value (e.g., 0) for all missing values of a given baseline variable and including a dummy variable to indicate cases that had a missing value for the variable (i.e., a value of 1 for cases with a missing value, and 0 for those with a non-missing value).

Student Subgroups

To address questions about impacts for subgroups of students, the subgroup variable (e.g., female) 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:

$$(4)\ \beta_{0j} = \gamma_{00} + \gamma_{01} Treatment_j + \sum_{n=2}^{8} \gamma_{0n}(RA_Blocks_{nj}) + \mu_{oj}$$
$$(5)\ \beta_{1j} = \gamma_{10} + \gamma_{11} Treatment_j$$

In Equations 4 and 5 above, and using the indictor 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 in the two subgroups (i.e., 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 (e.g., host institution is in a rural locale) was added to the regression model as an interaction term with the treatment variable.

$$(6)\ \beta_{0j} = \gamma_{00} + \gamma_{01} Treatment_j + \sum_{n=2}^{8} \gamma_{0n}(RA_Blocks_{nj}) + \gamma_{09} RuralHostInst_j * Trt_j + \mu_{oj}$$

In Equation 6, γ_{01} is the impact for non-rural host institutions, $\gamma_{01} + \gamma_{09}$ is the impact for rural host institutions, and γ_{09} is the difference in impacts between projects in the two subgroups (i.e., 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.

B.3.3 Sensitivity Analyses

Sensitivity analyses were conducted to examine the robustness of the findings for overall impacts with different model specifications, as follows:

- Logistic regression models were estimated because logistic, rather than linear, regression is commonly used for binary outcomes.
- A heteroscedasticity adjustment was included to further test the sensitivity of using linear models to estimate impacts for binary outcomes.
- Models were re-estimated without covariate adjustment because randomization should yield treatment and control groups that are equivalent on both observed and unobserved characteristics, making covariate adjustment unnecessary.[6]

[6] 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.

- Nonresponse weights were included for the interim outcomes drawn from the student follow-up survey in order to assess the sensitivity of findings to survey nonresponse.[7]

Findings from the sensitivity analyses were similar to findings from the main linear regression analysis (see Appendix C).

B.3.4 Variation by Implementation Levels

The study explored whether impacts on each of the four interim outcomes varied by projects' levels of implementation of *Find the Fit* defined as low, moderate and high. As described in Chapter 3, treatment group projects were categorized as high implementers if they implemented 75 percent or more of each *Find the Fit* component (student materials, text messages, or 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. For this analysis, implementation levels for the control group projects were estimated based on the relationship between project characteristics and the observed implementation level among treatment projects. Known baseline characteristics of control 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. Similar to the other subgroup analyses (described in B.3.2), the models both: (a) estimated the impact of *Find the Fit* for each of the implementation levels; and (b) tested for differences in impacts among the levels. Treatment group percentage and impact are estimated using the study's regression model.

B.4 Power Analyses

The study was designed to detect a minimum effect of 5 percentage points on the study's primary outcome (i.e., college academic 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 initial power analysis was based on specific assumptions about the number of students per project in the analytic sample, intraclass correlation, proportion of variance explained by covariates, and the success rate in the control group; the actual power of the study differed slightly. For example, the left panel of Exhibit B.13 shows the design phase assumptions and expected minimum detectable effect (MDE), whereas the right panel shows the observed statistics and achieved MDE that the study, as conducted, had 80 percent power to detect in the Apply to Four of More Colleges outcome.

[7] Weights to adjust for nonresponse were calculated following methods described in Puma, Olsen, Bell, and Price (2009). Specifically, a logistic regression model predicting the likelihood of nonresponse for each student, controlling for the full set of baseline student characteristics and adjusting for randomization blocks, was estimated separately for the treatment and control groups. Then, covariates with *p*-values >0.5 were dropped from the model, and nonresponse weights were calculated as the inverse of the propensity scores.

Exhibit B.13: Comparison of Design Assumptions and Actual Sample Statistics

	Design Phase Assumptions	Observed Statistics in Analytic Sample for Apply to Four or More Colleges
Number of projects	200	194
Proportion assigned to treatment group	.50	.51
Number of students per project	16	19
Intraclass correlation	0.100	0.173
Student-level R-squared	.080	.071
Project-level R-squared	.320	.345
Success rate in control group	.800	.437
Minimum Detectable Effect	0.14 SD units, or 5 percentage points	0.16 SD units, or 8 percentage points

SD is standard deviation.

The achieved MDEs for the interim outcomes ranged from 4 to 8 percentage points (Exhibit B.14). The higher achieved than expected MDEs for some of the interim outcomes primarily resulted from intraclass correlations that were higher than the assumptions made in the design phase and from success rates in the control group (e.g., the number of students who completed the FAFSA by March 15) that were lower than the assumptions made in the design phase.

Exhibit B.14: Achieved Minimum Detectable Effects for Overall Sample for Interim Outcomes and College Advising Measures

Variable	Achieved MDEs
Interim Outcome	
Applied to four or more colleges	8.1
Selectivity level of colleges to which student applied:	
Most competitive	4.3
At least highly competitive	6.7
At least very competitive	7.1
At least competitive	7.7
At least somewhat competitive	7.6
Any four-year college	6.7
Any college	6.1
Importance placed on academic quality	4.4
Completed the FAFSA by March 15	7.8
College Advising Measure	
Encouraged to consider net cost	5.1
Encouraged to consider college match	6.2
Encouraged to consider graduation/employment rates	5.8
Encouraged to think about ability to adapt to college	5.6
Discussed all six milestones with advisor	5.2
Encouraged to apply to four or more colleges	8.3
Encouraged to complete the FAFSA by March 15	7.0

Relative to the main analyses, the MDEs were larger for analyses with student and project subgroups, especially for subgroups with relatively few students, including the highest college entrance exam score quartile, non-college host institution, and rural host institution subgroups (Exhibit B.15 and Exhibit B.16).

Exhibit B.15: Achieved Minimum Detectable Effects for Student and Project Subgroups for Three Interim Outcomes

	Applied to Four or More Colleges	Importance Placed on Academic Quality	Completed FAFSA by March 15
Gender			
Male	10.0	6.8	9.2
Female	8.7	5.2	8.3
Race/Ethnicity			
Hispanic	12.2	8.3	11.3
White, non-Hispanic	12.8	8.5	11.8
Black, non-Hispanic	11.0	7.0	10.3
Other, non-Hispanic	15.4	11.5	14.0
College Entrance Exam Score Quartile			
Highest quartile	19.7	16.6	18.3
Second quartile	13.8	10.9	12.8
Third quartile	12.0	9.0	11.1
Lowest quartile	10.1	6.8	9.3
Missing score	11.1	7.8	10.2
Host Institution Type			
Four-year college	10.6	5.7	10.3
Two-year college	14.7	8.5	14.3
Other	23.5	12.7	22.9
Locale			
City/suburb/town	8.7	4.7	8.3
Rural	23.9	13.5	23.0

Exhibit B.16: Achieved Minimum Detectable Effects for Student and Project Subgroups for Selectivity Level of Colleges to which Students Applied

	Most Competitive	At Least Highly Competitive	At Least Very Competitive	At Least Competitive	At Least Somewhat Competitive	Any Four-Year College	Any College
Gender							
Male	5.5	8.2	9.1	9.4	9.3	8.5	7.7
Female	4.6	7.2	7.7	8.2	8.1	7.2	6.6
Race/Ethnicity							
Hispanic	6.8	9.9	11.2	11.5	11.4	10.5	9.5
White, non-Hispanic	7.1	10.4	11.7	12.0	11.9	11.0	9.9
Black, non-Hispanic	6.0	9.0	10.0	10.4	10.3	9.4	8.5
Other, non-Hispanic	8.8	12.5	14.4	14.5	14.3	13.5	12.2
College Entrance Exam Score Quartile							
Highest quartile	11.6	16.0	18.9	18.5	18.2	17.7	15.9
Second quartile	7.9	11.2	13.0	13.0	12.8	12.2	11.0
Third quartile	6.8	9.8	11.2	11.3	11.2	10.5	9.4
Lowest quartile	5.6	8.2	9.2	9.5	9.4	8.6	7.7
Missing score	6.2	9.1	10.2	10.4	10.3	9.6	8.6
Host Institution Type							
Four-year college	5.6	8.8	9.3	10.0	10.0	8.7	8.0
Two-year college	7.9	12.2	13.1	13.9	13.9	12.2	11.1
Other	12.5	19.6	20.8	22.3	22.3	19.3	17.7
Locale							
City/suburb/town	4.5	7.1	7.6	8.1	8.1	7.1	6.4
Rural	12.6	19.7	21.0	22.4	22.5	19.7	17.8

Appendix C. Supplemental Information for Chapter 2

This appendix contains the underlying data used to generate the exhibits in Chapter 2, the chapter on *Find the Fit*'s impacts on interim outcomes. The appendix also includes the results of sensitivity analyses conducted for the interim outcomes and described in Section B.3.3.

C.1 Applied to Four or More Colleges

Exhibit C.1: Impacts of *Find the Fit* on Whether Students Applied to Four or More Colleges, Overall and for Subgroups

	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Overall Impact				
	53.0	43.7	9.2	.001
Impact by Student Characteristic				
Gender				
Female	55.2	46.3	8.9	.004
Male	49.1	39.1	10.1	.005
F-test of difference[b]		*p*=.699		
Race/Ethnicity				
Hispanic	56.6	44.5	12.1	.006
White, non-Hispanic	42.4	35.8	6.6	.150
Black, non-Hispanic	58.2	49.0	9.2	.020
Other, non-Hispanic	52.1	43.6	8.5	.122
F-test of difference[b]		*p*=.789		
College Entrance Exam Score Quartile				
Highest quartile	70.5	66.7	3.9	.584
Second quartile	66.3	52.6	13.7	.006
Third quartile	59.9	51.4	8.5	.047
Lowest quartile	50.5	40.5	10.0	.005
Missing score	42.7	34.8	7.9	.047
F-test of difference[b]		*p*=.714		
Impact by Project Characteristic				
Host Institution Type				
Four-year college	51.5	45.2	6.3	.094
Two-year college	47.5	36.4	11.1	.034
Other	71.6	52.2	19.5	.020
F-test of difference[b]		*p*=.329		
Locale				
Rural	44.0	26.2	17.8	.037
City/suburb/town	54.1	46.0	8.1	.009
F-test of difference[b]		*p*=.286		

[a] *p*-values in this column are for tests of whether there was a statistically significant impact for the subgroup category indicated in the row.

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

Note: Sample = 1,920 treatment group students and 1,710 control group students for overall impact, 1,913 treatment group students and 1,707 control group students for gender, 1,909 treatment group students and 1,704 control group students for race/ethnicity, 1,920 treatment group students and 1,710 control group students for college entrance exam scores, 1,920 treatment group students and 1,710 control group students for host institution type, and 1,920 treatment group students and 1,710 control group students for locale. Percent represents the share of students who reported applying to four or more colleges. Treatment group percentage and impact are estimated using the study's regression model.

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

Exhibit C.2: Sensitivity Analyses for Impact of *Find the Fit* on Whether Students Applied to Four or More Colleges

Model	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value
Linear regression (main model)	53.0	43.7	9.2	.001
Logistic regression	53.4	43.7	9.7	.001
Heteroscedasticity adjustment	53.0	43.7	9.2	.002
No covariates used in model	54.4	43.7	10.6	.001
Weighted	52.7	43.7	8.9	.002

Notes: Sample = 1,920 treatment group students and 1,710 control group students. Percent represents the share of students who reported applying to four or more colleges. Treatment group percentage and impact are estimated using the study's regression model.

Source: Follow-up student survey 2016.

Treatment group students reported applying to an average of 4.0 colleges, whereas control group students reported applying to an average of 3.5 colleges; the median for treatment and control group students was 4 and 3, respectively. Exhibit C.3 shows the number of colleges to which treatment and control group students reported applying.

Exhibit C.3: Number of Colleges to which Students Reported Applying

Number of Colleges	Treatment Group Students (%)	Control Group Students (%)
0	8.9	8.9
1	12.6	16.5
2	10.9	14.4
3	13.8	16.5
4	14.1	13.0
5	11.0	10.2
6	7.0	5.9
7	5.1	3.7
8	16.7	10.9

Note: Sample = 1,920 treatment group students and 1,710 control group students.

Source: Follow-up student survey 2016.

C.2 Selectivity Level of Colleges to Which Students Applied

Exhibit C.4: Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied

Selectivity Level	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value
Most competitive	11.0	7.4	3.6	.018
At least highly competitive	24.9	17.4	7.6	.002
At least very competitive	48.1	37.8	10.3	.000
At least competitive	71.3	63.4	7.9	.004
At least somewhat competitive	73.7	65.8	7.8	.004
Any four-year college	75.9	70.7	5.2	.030
Any college	83.8	79.9	4.0	.067

Notes: Sample = 1,920 treatment group students and 1,710 control group students. Treatment group percentage and impact are estimated using the study's regression model.

Percentage of students represents those who applied a college of at least a given selectivity level (e.g., at least a "very competitive" college includes applications to colleges at the two selectivity levels above "very competitive", "highly competitive" and "most competitive").

Source: Follow-up student survey 2016; NCES-Barron's Admissions Competitiveness Index 2014.

Exhibit C.5: Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied, by Student Subgroup

Selectivity Level Subgroup	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Most Competitive				
Gender				
Female	11.0	6.7	4.3	.010
Male	11.0	8.6	2.4	.230
F-test of difference[b]		*p*=.315		
Race/Ethnicity				
Hispanic	13.4	9.0	4.4	.071
White, non-Hispanic	8.8	5.4	3.4	.177
Black, non-Hispanic	10.0	5.1	4.9	.022
Other, non-Hispanic	12.5	14.5	–2.1	.510
F-test of difference[b]		*p*=.224		
College Entrance Exam Score Quartile				
Highest quartile	43.1	24.4	18.7	.000
Second quartile	19.4	15.3	4.1	.147
Third quartile	15.0	9.8	5.2	.032
Lowest quartile	5.8	3.9	1.9	.337
Missing score	5.6	3.6	2.0	.363
F-test of difference[b]		*p*=.002		

Selectivity Level Subgroup	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
At Least Highly Competitive				
Gender				
Female	24.6	16.3	8.3	.001
Male	25.7	19.4	6.3	.031
F-test of difference[b]		*p*=.440		
Race/Ethnicity				
Hispanic	31.1	19.8	11.4	.001
White, non-Hispanic	19.5	17.6	2.0	.598
Black, non-Hispanic	22.1	12.9	9.2	.004
Other, non-Hispanic	31.0	25.2	5.8	.197
F-test of difference[b]		*p*=.172		
College Entrance Exam Score Quartile				
Highest quartile	58.8	45.6	13.2	.020
Second quartile	41.7	33.5	8.2	.041
Third quartile	29.8	22.1	7.7	.026
Lowest quartile	17.8	12.6	5.2	.076
Missing score	17.7	8.2	9.4	.004
F-test of difference[b]		*p*=.581		
At Least Very Competitive				
Gender				
Female	48.7	37.4	11.3	.000
Male	47.4	38.7	8.6	.008
F-test of difference[b]		*p*=.381		
Race/Ethnicity				
Hispanic	54.4	41.0	13.4	.001
White, non-Hispanic	42.6	36.0	6.6	.115
Black, non-Hispanic	45.3	33.9	11.4	.001
Other, non-Hispanic	54.7	46.2	8.6	.096
F-test of difference[b]		*p*=.589		
College Entrance Exam Score Quartile				
Highest quartile	79.9	71.1	8.7	.195
Second quartile	70.1	53.6	16.5	.000
Third quartile	53.5	45.4	8.0	.044
Lowest quartile	39.5	29.1	10.4	.002
Missing score	40.2	30.8	9.4	.010
F-test of difference[b]		*p*=.571		
At Least Competitive				
Gender				
Female	72.7	64.4	8.4	.004
Male	68.9	61.6	7.3	.028
F-test of difference[b]		*p*=.722		

Selectivity Level Subgroup	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Race/Ethnicity				
Hispanic	71.7	61.8	9.9	.015
White, non-Hispanic	66.4	59.9	6.5	.128
Black, non-Hispanic	74.3	67.3	7.0	.058
Other, non-Hispanic	72.2	62.0	10.3	.047
F-test of difference[b]		*p*=.848		
College Entrance Exam Score Quartile				
Highest quartile	88.4	82.2	6.2	.350
Second quartile	84.1	72.7	11.4	.014
Third quartile	76.3	70.7	5.6	.162
Lowest quartile	64.0	57.0	7.0	.038
Missing score	68.8	59.2	9.6	.010
F-test of difference[b]		*p*=.772		
At Least Somewhat Competitive				
Gender				
Female	74.8	66.4	8.4	.004
Male	71.8	64.9	6.9	.037
F-test of difference[b]		*p*=.613		
Race/Ethnicity				
Hispanic	73.6	64.8	8.8	.029
White, non-Hispanic	69.6	62.4	7.2	.089
Black, non-Hispanic	77.0	69.6	7.3	.046
Other, non-Hispanic	72.5	63.7	8.8	.083
F-test of difference[b]		*p*=.979		
College Entrance Exam Score Quartile				
Highest quartile	89.9	82.2	7.7	.240
Second quartile	84.7	74.2	10.6	.021
Third quartile	78.8	72.2	6.6	.099
Lowest quartile	67.8	60.6	7.2	.032
Missing score	70.0	61.6	8.4	.022
F-test of difference[b]		*p*=.943		
Any Four-Year College				
Gender				
Female	76.4	70.8	5.6	.030
Male	75.1	70.5	4.6	.128
F-test of difference[b]		*p*=.728		
Race/Ethnicity				
Hispanic	77.6	73.5	4.1	.277
White, non-Hispanic	72.7	66.4	6.2	.112
Black, non-Hispanic	76.9	71.7	5.2	.124
Other, non-Hispanic	76.8	70.9	5.9	.221

Selectivity Level Subgroup	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
F-test of difference[b]		*p*=.975		
College Entrance Exam Score Quartile				
Highest quartile	90.1	83.3	6.8	.284
Second quartile	84.9	77.5	7.3	.091
Third quartile	80.3	75.1	5.2	.165
Lowest quartile	69.9	66.5	3.4	.265
Missing score	74.1	67.8	6.3	.065
F-test of difference[b]		*p*=.900		
Any College				
Gender				
Female	83.6	79.7	3.9	.093
Male	84.4	80.3	4.1	.137
F-test of difference[b]		*p*=.957		
Race/Ethnicity				
Hispanic	82.6	83.3	–0.7	.839
White, non-Hispanic	83.4	79.7	3.6	.306
Black, non-Hispanic	83.5	76.7	6.9	.024
Other, non-Hispanic	88.1	82.9	5.2	.231
F-test of difference[b]		*p*=.293		
College Entrance Exam Score Quartile				
Highest quartile	92.4	85.6	6.8	.229
Second quartile	89.1	83.7	5.4	.167
Third quartile	88.9	82.6	6.3	.061
Lowest quartile	79.2	76.9	2.3	.407
Missing score	82.6	79.1	3.5	.257
F-test of difference[b]		*p*=.781		

[a] *p*-values in this column are for tests of whether there was a statistically significant impact for the subgroup category indicated in the row.

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

Notes: Sample = 1,913 treatment group students and 1,707 control group students for gender, 1,909 treatment group students and 1,704 control group students for race/ethnicity, and 1,920 treatment group students and 1,710 control group students for college entrance exam scores. Treatment group percentage and impact are estimated using the study's regression model. Percentage of students represents those who applied a college of at least a given selectivity level (e.g., at least a "very competitive" college includes applications to colleges at the two selectivity levels above "very competitive", "highly competitive" and "most competitive").

Source: Follow-up student survey 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; college entrance exam score data 2015; baseline student survey 2015.

Exhibit C.6: Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied, by Project Subgroup

Selectivity Level Subgroup	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Most Competitive				
Host Institution Type				
Four-year college	10.8	7.6	3.2	.114
Two-year college	7.4	4.2	3.1	.266
Other	20.3	12.9	7.4	.099
F-test of difference[b]		*p*=.675		
Locale				
Rural	8.6	3.1	5.5	.226
City/suburb/town	11.3	7.9	3.4	.038
F-test of difference[b]		*p*=.664		
At Least Highly Competitive				
Host Institution Type				
Four-year college	24.1	18.6	5.6	.077
Two-year college	20.4	11.8	8.6	.047
Other	38.6	23.4	15.2	.030
F-test of difference[b]		*p*=.435		
Locale				
Rural	15.4	7.9	7.5	.286
City/suburb/town	26.2	18.6	7.6	.003
F-test of difference[b]		*p*=.991		
At Least Very Competitive				
Host Institution Type				
Four-year college	49.0	41.5	7.5	.024
Two-year college	40.9	29.1	11.8	.011
Other	58.9	38.3	20.6	.005
F-test of difference[b]		*p*=.254		
Locale				
Rural	38.9	22.5	16.4	.029
City/suburb/town	49.3	39.8	9.5	.000
F-test of difference[b]		*p*=.389		
At Least Competitive				
Host Institution Type				
Four-year college	72.4	68.3	4.1	.255
Two-year college	64.3	53.3	11.0	.026
Other	79.9	60.3	19.6	.014
F-test of difference[b]		*p*=.155		
Locale				
Rural	67.8	48.7	19.1	.017

Selectivity Level Subgroup	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
City/suburb/town	71.7	65.2	6.5	.026
F-test of difference[b]		*p*=.138		
At Least Somewhat Competitive				
Host Institution Type				
Four-year college	75.2	70.7	4.5	.209
Two-year college	66.4	55.6	10.9	.029
Other	80.4	63.6	16.7	.036
F-test of difference[b]		*p*=.286		
Locale				
Rural	68.7	53.4	15.3	.057
City/suburb/town	74.2	67.4	6.8	.019
F-test of difference[b]		*p*=.322		
Any Four-Year College				
Host Institution Type				
Four-year college	77.1	76.8	0.3	.914
Two-year college	70.2	59.3	10.9	.012
Other	79.4	64.6	14.8	.032
F-test of difference[b]		*p*=.047		
Locale				
Rural	71.6	61.8	9.8	.163
City/suburb/town	76.4	71.8	4.6	.072
F-test of difference[b]		*p*=.483		
Any College				
Host Institution Type				
Four-year college	83.4	81.9	1.5	.593
Two-year college	83.8	78.2	5.6	.157
Other	84.8	73.2	11.6	.068
F-test of difference[b]		*p*=.308		
Locale				
Rural	80.5	83.8	–3.3	.602
City/suburb/town	84.3	79.4	4.9	.033
F-test of difference[b]		*p*=.225		

[a] *p*-values in this column are for tests of whether there was a statistically significant impact for the subgroup category indicated in the row.

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

Notes: Sample = 1,920 treatment group students and 1,710 control group students. Treatment group percentage and impact are estimated using the study's regression model. Percentage of students represents those who applied a college of at least a given selectivity level (e.g., at least a "very competitive" college includes applications to colleges at the two selectivity levels above "very competitive", "highly competitive" and "most competitive").

Source: Follow-up student survey 2016; NCES-Barron's Admissions Competitiveness Index 2014; APR 2014-15; IPEDS 2015-16.

Exhibit C.7: Sensitivity Analyses for Impact of *Find the Fit* on Selectivity Level of Colleges to which Students Applied

Selectivity Level Model	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value
Most Competitive				
Linear regression (main model)	11.0	7.4	3.6	.018
Logistic regression	11.1	7.4	3.7	.016
Heteroscedasticity adjustment	11.0	7.4	3.6	.016
No covariates used in model	11.9	7.4	4.5	.008
Weighted	10.9	7.4	3.5	.016
At Least Highly Competitive				
Linear regression (main model)	24.9	17.4	7.6	.002
Logistic regression	25.0	17.4	7.6	.001
Heteroscedasticity adjustment	24.9	17.4	7.6	.002
No covariates used in model	26.1	17.4	8.7	.002
Weighted	24.8	17.4	7.4	.001
At Least Very Competitive				
Linear regression (main model)	48.1	37.8	10.3	.000
Logistic regression	49.2	37.8	11.4	.000
Heteroscedasticity adjustment	48.1	37.8	10.3	.000
No covariates used in model	49.5	37.8	11.7	.000
Weighted	47.8	37.8	10.0	.000
At Least Competitive				
Linear regression (main model)	71.3	63.4	7.9	.004
Logistic regression	72.2	63.4	8.8	.005
Heteroscedasticity adjustment	71.3	63.4	7.9	.005
No covariates used in model	72.4	63.4	9.0	.004
Weighted	71.2	63.4	7.8	.004
At Least Somewhat Competitive				
Linear regression (main model)	73.7	65.8	7.8	.004
Logistic regression	74.6	65.8	8.8	.005
Heteroscedasticity adjustment	73.7	65.8	7.8	.006
No covariates used in model	74.6	65.8	8.8	.004
Weighted	73.5	65.8	7.7	.005
Any Four-Year College				
Linear regression (main model)	75.9	70.7	5.2	.030
Logistic regression	76.7	70.7	6.0	.040
Heteroscedasticity adjustment	75.9	70.7	5.2	.037
No covariates used in model	76.8	70.7	6.1	.017
Weighted	75.6	70.7	4.9	.039

Selectivity Level Model	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value
Any College				
Linear regression (main model)	83.8	79.9	4.0	.067
Logistic regression	84.2	79.9	4.4	.075
Heteroscedasticity adjustment	83.8	79.9	4.0	.077
No covariates used in model	84.2	79.9	4.3	.052
Weighted	83.7	79.9	3.8	.079

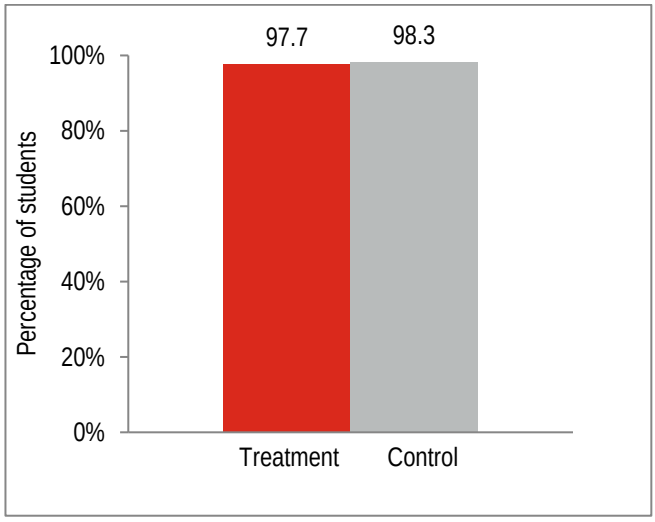
Notes: Sample = 1,920 treatment group students and 1,710 control group students. Treatment group percentage and impact are estimated using the study's regression model. Percentage of students represents those who applied a college of at least a given selectivity level (e.g., at least a "very competitive" college includes applications to colleges at the two selectivity levels above "very competitive", "highly competitive" and "most competitive").

Source: Follow-up student survey 2016; NCES-Barron's Admissions Competitiveness Index 2014.

C.3 Importance of Academic Quality in Choosing a College

Exhibit 2.7 showed that *Find the Fit* had no impact on whether academic quality was "very important" to students in choosing a college. Exhibit C.8 shows similar results when responses of "somewhat important" or "very important" were combined.

Exhibit C.8: Impact of *Find the Fit* on Whether Academic Quality was Somewhat Important or Very Important to Students in Choosing a College



Notes: Sample = 1,920 treatment group students and 1,710 control group students. Percentage of students represents those who reported academic quality is "somewhat important" or "very important" in choosing a college. Treatment group percentage and impact are estimated using the study's regression model.

Source: Follow-up student survey 2016.

Exhibit C.9: Impacts of *Find the Fit* on Whether Academic Quality was Very Important to Students in Choosing a College, Overall and for Subgroups

	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Overall Impact				
	77.3	78.1	–0.8	.598
Impact by Student Characteristic				
Gender				
Female	79.0	80.5	–1.5	.404
Male	74.4	73.7	0.7	.759
F-test of difference[b]		*p*=.420		
Race/Ethnicity				
Hispanic	74.3	76.5	–2.2	.469
White, non-Hispanic	72.1	73.0	–0.9	.769
Black, non-Hispanic	84.6	84.2	0.4	.864
Other, non-Hispanic	72.7	73.9	-1.2	.766
F-test of difference[b]		*p*=.925		
College Entrance Exam Score Quartile				
Highest quartile	72.9	80.0	–7.1	.228
Second quartile	76.4	78.9	–2.6	.507
Third quartile	72.1	75.4	–3.3	.309
Lowest quartile	78.4	78.6	–0.1	.956
Missing score	80.0	78.7	1.4	.624
F-test of difference[b]		*p*=.618		
Impact by Project Characteristic				
Host Institution Type				
Four-year college	77.2	76.7	0.6	.784
Two-year college	75.7	80.2	–4.6	.134
Other	81.5	80.9	0.7	.883
F-test of difference[b]		*p*=.355		
Locale				
Rural	73.9	75.9	–2.0	.677
City/suburb/town	77.7	78.4	–0.7	.679
F-test of difference[b]		*p*=.797		

[a] *p*-values in this column are for tests of whether there was a statistically significant impact for the subgroup category indicated in the row.

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

Notes: Sample = 1,920 treatment group students and 1,710 control group students for overall impact, 1,913 treatment group students and 1,707 control group students for gender, 1,909 treatment group students and 1,704 control group students for race/ethnicity, 1,920 treatment group students and 1,710 control group students for college entrance exam scores, 1,920 treatment group students and 1,710 control group students for host institution type, and 1,920 treatment group students and 1,710 control group students for locale.

Percent represents the share of students who reported academic quality is "very important." Treatment group percentage and impact are estimated using the study's regression model.

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

Exhibit C.10: Sensitivity Analyses for Impact of *Find the Fit* on Whether Academic Quality was Very Important to Students in Choosing a College

Model	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value
Linear regression (main model)	77.3	78.1	–0.8	.598
Logistic regression	78.8	78.1	0.7	.562
Heteroscedasticity adjustment	77.3	78.1	–0.8	.622
No covariates used in model	77.6	78.1	–0.5	.781
Weighted	77.3	78.1	–0.8	.617

Notes: Sample = 1,920 treatment group students and 1,710 control group students. Percent represents the share of students who reported academic quality is "very important." Treatment group percentage and impact are estimated using the study's regression model.

Source: Follow-up student survey 2016.

C.4 Complete FAFSA by March 15

Exhibit C.11: Impacts of *Find the Fit* on Whether Students Completed the FAFSA by March 15, Overall and for Subgroups

	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Overall Impact				
	64.6	60.9	3.7	.185
Impact by Student Characteristic				
Gender				
Female	67.1	62.0	5.2	.080
Male	60.3	59.3	1.1	.743
F-test of difference[b]			*p*=.135	
Race/Ethnicity				
Hispanic	64.8	61.3	3.5	.383
White, non-Hispanic	67.8	70.0	–2.2	.604
Black, non-Hispanic	64.1	54.2	9.9	.007
Other, non-Hispanic	59.9	63.3	–3.4	.496
F-test of difference[b]			*p*=.032	
College Entrance Exam Score Quartile				
Highest quartile	87.3	90.1	–2.8	.669
Second quartile	83.2	80.7	2.5	.583
Third quartile	74.0	70.8	3.2	.418
Lowest quartile	60.0	52.2	7.8	.018
Missing score	53.5	53.1	0.3	.928
F-test of difference[b]			*p*=.198	
Impact by Project Characteristic				
Host Institution Type				
Four-year college	64.4	63.7	0.8	.836
Two-year college	61.5	52.2	9.3	.069
Other	68.7	64.3	4.4	.593
F-test of difference[b]			*p*=.398	
Locale				
Rural	67.7	55.6	12.1	.141
City/suburb/town	64.2	61.6	2.6	.383
F-test of difference[b]			*p*=.277	

[a] *p*-values in this column are for tests of whether there was a statistically significant impact for the subgroup category indicated in the row.

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

Notes: Sample = 2,336 treatment group students and 2,107 control group students for overall impact, 2,318 treatment group students and 2,102 control group students for gender, 2,311 treatment group students and 2,099 control group students for race/ethnicity, 2,336 treatment group students and 2,107 control group students for college entrance exam scores, 2,336 treatment group students and 2,107 control group students for host institution type, and 2,336 treatment group students and 2,107 control group students for locale.

Percent represents the share of students who completed the FAFSA by March 15 of their senior year. Treatment group percentage and impact are estimated using the study's regression model.

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

Exhibit C.12: Sensitivity Analyses for Impact of *Find the Fit* on Whether Students Completed the FAFSA by March 15

Model	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value
Linear regression (main model)	64.6	60.9	3.7	.185
Logistic regression	65.7	60.9	4.8	.239
Heteroscedasticity adjustment	64.6	60.9	3.7	.195
No covariates used in model	65.3	60.9	4.4	.158

Notes: Sample = 2,336 treatment group students and 2,107 control group students. Percent represents the share of students who completed the FAFSA by March 15 of their senior year. Treatment group percentage and impact are estimated using the study's regression model. There is no weighted sensitivity analysis for this outcome because there are no missing data for this outcome.

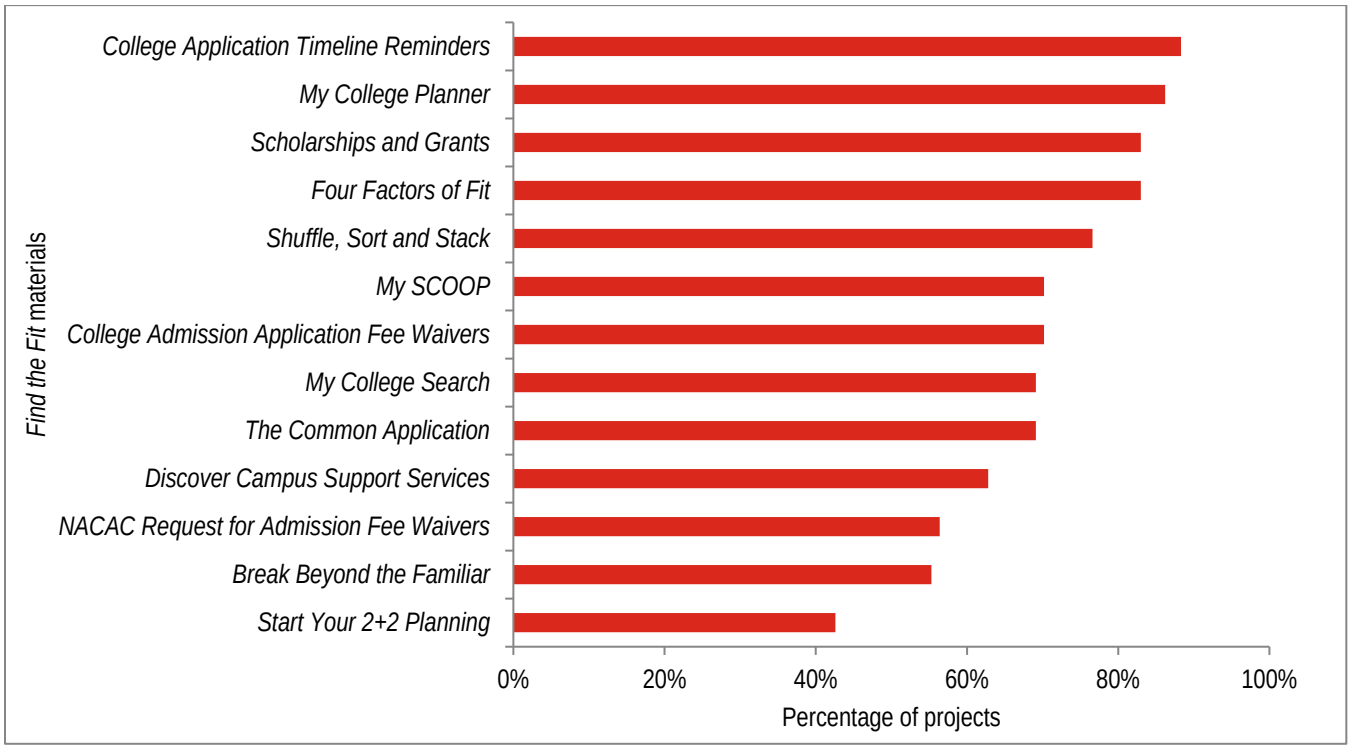
Source: FSA 2016.

Appendix D. Supplemental Information for Chapter 3

This appendix provides additional information about projects' use of the *Find the Fit* student materials to supplement the data provided in Chapter 3.

Exhibit D.1 provides more details on the specific student materials that treatment projects reported using. The four most commonly used materials—the *College Application Timeline Reminders* sheet, *My College Planner* booklet, *Scholarships and Grants* guide, and *Four Factors of Fit* handout—were each reported as used by more than 80 percent of projects. The *Start Your 2+2 Planning* guide was the least used student material: only 43 percent of treatment projects reported using it. Another material with lower usage was the *Break Beyond the Familiar* activity; slightly more than half of projects reported using this material that involved the adaptive mindset video and an activity to encourage students to recognize their own ability to learn and grow in unfamiliar environments.

Exhibit D.1: Treatment Group Projects' Reported Use of Each *Find the Fit* Material



Notes: Sample = 94 treatment group projects. Percent represents the share of treatment group projects that reported using each *Find the Fit* material.

Source: Project survey 2016.

Exhibit D.2 and Exhibit D.3 explore impacts on each of the interim outcomes by level of implementation of *Find the Fit*. Across the four interim outcomes, there was not a consistent pattern of variation in impacts associated with the different levels of *Find the Fit* implementation, nor were there any statistically significant differences in impacts by implementation level. The lack of consistent differences across implementation levels may suggest that the implementation measures the study created mask

importance differences in how projects implemented *Find the Fit* or they may derive from the flexibility treatment group projects had to use *Find the Fit* as they deemed best.

Exhibit D.2: Impacts of *Find the Fit* on Three Interim Outcomes, by Project Implementation Category

	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Panel 1. Applied to Four or More Colleges				
Low implementers	38.3	41.2	–2.9	.734
Moderate implementers	56.2	46.0	10.2	.019
High implementers	53.3	42.3	11.1	.016
F-test of difference[b]		*p*=.334		
Panel 2. Rated Academic Quality as Very Important in Choosing a College				
Low implementers	76.0	84.0	–8.1	.088
Moderate implementers	78.3	79.9	–1.6	.483
High implementers	76.8	75.1	1.7	.478
F-test of difference[b]		*p*=.173		
Panel 3. Completed FAFSA by March 15				
Low implementers	58.9	55.7	3.2	.699
Moderate implementers	64.7	64.2	0.5	.908
High implementers	65.9	59.0	6.9	.120
F-test of difference[b]		*p*=.581		

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

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

Notes: Sample for panels 1 and 2 = 217 treatment group students and 194 control group students in the low implementers category, 1,011 treatment group students and 726 control group students in the moderate implementers category, and 692 treatment group students and 790 control group students in the high implementers category. Sample for panel 3 = 267 treatment group students and 235 control group students in the low implementers category, 1,267 treatment group students and 919 control group students in the moderate implementers category, and 802 treatment group students and 953 control group students in the high implementers category. Percentage represents the share of students who (panel 1) reported applying to four or more colleges by spring of their senior year in high school; (panel 2) reported academic quality was "very important" in choosing a college; and (panel 3) completed the FAFSA by March 15 of their senior year of high school. Treatment group percentage and impact are estimated using the study's regression model. Treatment group projects were categorized as low implementers if they implemented less than 25 percent of any one *Find the Fit*; 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.

Source: For all panels – project survey 2016 and intervention monitoring data 2015-16; for panels 1 and 2 – follow-up student survey 2016; for panel 3—Federal Student Aid 2016.

Exhibit D.3: Impacts of *Find the Fit* on Selectivity Level of Colleges to which Students Applied, by Project Implementation Category

	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
Most Competitive				
Low implementers	10.5	5.2	5.3	.242
Moderate implementers	10.9	7.2	3.8	.103

	Treatment Group Students (%)	Control Group Students (%)	Impact	*p*-value[a]
High implementers	11.3	8.1	3.2	.193
F-test of difference[b]		*p*=.917		
At Least Highly Competitive				
Low implementers	19.3	14.4	4.9	.489
Moderate implementers	25.7	18.0	7.7	.034
High implementers	25.3	17.5	7.9	.039
F-test of difference[b]		*p*=.930		
At Least Very Competitive				
Low implementers	40.4	32.5	7.9	.295
Moderate implementers	47.9	41.2	6.7	.081
High implementers	50.6	36.1	14.5	.000
F-test of difference[b]		*p*=.358		
At Least Competitive				
Low implementers	59.9	53.1	6.8	.400
Moderate implementers	74.7	65.6	9.2	.026
High implementers	70.9	63.9	6.9	.111
F-test of difference[b]		*p*=.924		
At Least Somewhat Competitive				
Low implementers	60.5	55.7	4.9	.545
Moderate implementers	76.8	67.6	9.1	.026
High implementers	74.0	66.7	7.3	.091
F-test of difference[b]		*p*=.884		
Any Four-Year College				
Low implementers	62.3	58.2	4.1	.562
Moderate implementers	78.5	72.3	6.1	.084
High implementers	76.9	72.3	4.7	.213
F-test of difference[b]		*p*=.945		
Any College				
Low implementers	83.0	78.4	4.7	.466
Moderate implementers	85.5	79.2	6.3	.055
High implementers	82.3	80.9	1.4	.674
F-test of difference[b]		*p*=.600		

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

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

Notes: Sample = 217 treatment group students and 194 control group students in the low implementers category, 1,011 treatment group students and 726 control group students in the moderate implementers category, and 692 treatment group students and 790 control group students in the high implementers category. Treatment group percentage and impact are estimated using the study's regression model. Treatment 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.

Source: Follow-up student survey 2016; NCES-Barron's Admissions Competitiveness Index 2014; project survey 2016; intervention monitoring data 2015-16.

This page has been left blank for double–sided copying.