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To and Through College: Investigating Attitudes Towards, Enrollment in, and Graduation from College

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To and Through College:
Investigating Attitudes Towards, Enrollment in, and Graduation from College

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by

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This dissertation is approved for recommendation to the Graduate Council.

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Abstract

Postsecondary access and degree completion are increasingly important concerns for individuals and policymakers. This dissertation presents evidence on three distinct strategies for increasing students' level of preparedness for higher education, rates of postsecondary enrollment, and rates of postsecondary degree completion. The first is an intervention aimed at increasing eighth-grade students' familiarity with college life. Results from an experimental study indicate that students assigned to participate in campus visits demonstrate higher levels of knowledge about college, are more likely to have conversations with school personnel about college, put forth higher levels of effort while completing a college-related survey, and express a decreased desire to attend technical school. Additionally, treated students are more likely to enroll in advanced math and science/social science courses in ninth grade. The second strategy is a place-based program that guarantees a college scholarship to all students enrolled in the Promise district for ninth through 12th grades. Results from a quasi-experimental evaluation indicate that a Promise program in a rural area can increase postsecondary enrollment and bachelor's degree completion rates, although effects vary by student characteristics. For example, we find larger enrollment effects for students of color and for students with below-average grade point averages, but larger completion effects for white students and students with above-average grade point averages. The third strategy is on-campus support services, whose goal is to facilitate students' successful transition through college and to graduation. My descriptive analysis indicates that students' ability to access on-campus resources is correlated with their background characteristics and personality and may be hindered by faculty and staff's lack of awareness of available services. This work also indicates that students who utilize on-campus resources report higher levels of a sense of belonging and college persistence.

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The work presented in this dissertation has benefitted immensely from the care and dedication of a team of researchers, including Gary Ritter, Gema Zamarro, Jonathan Mills, Katherine Kopotic, and Jay Greene. Additionally, all three chapters have been strengthened thanks to the thoughtful and insightful comments received from discussants and audience members at the Association for Public Policy And Management and the Association for Education Finance and Policy, as well as faculty and staff at the Department of Education Reform.

I am grateful to the faculty and students in the Department of Education Reform who have been instrumental in my growth as a researcher over the past four years. Thank you to my family, for always supporting my decisions, regardless of how difficult the path may initially seem, and to my friends, for reminding me that everything will work out when I start to doubt myself. Finally, I am forever grateful to the amazing community of women who surround and support me no matter how far apart life takes us.

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Swanson, E., Kopotic, K., Zamarro, G., Mills, J., Greene, J., & Ritter, G. (2019). An evaluation of the educational impact of college campus visits: A randomized experiment. *EDRE Working Paper 2019-02.* (Chapter 1 of this dissertation).

Swanson, E. & Ritter, G. (under review). Start to Finish: Examining the impact of the El Dorado Promise on postsecondary outcomes. Submitted to *Journal of Student Financial Aid*. (Chapter 2 of this dissertation).

Introduction

Increasing rates of college access and degree completion is a matter of some urgency from both a pragmatic economic and social equality perspective. From an economic standpoint, increasing rates of college-going and degree completion is important from both an individual and societal perspective. Despite variations in earnings by major, individuals experience a positive return to holding a postsecondary credential (McMahon, 2018; Oreopoulos & Petronijevic, 2013; Hershbein & Kearney, 2014) and are less likely to be unemployed (Whistle, 2019). Researchers have also documented a positive return to obtaining a postsecondary education, including for students on the margin of attendance (Zimmerman, 2011). Further, college-educated individuals can expect greater job security, with some researchers predicting that almost half of jobs that currently do not require a college degree will be automated as technology, particularly artificial intelligence, continues to advance (Muro, Maxim, & Whiton, 2019). There are substantial spillover benefits of increased college-going rates as well. For example, skilled workers living in areas with higher shares of college-educated workers enjoy higher wages than non-college educated workers in other contexts (Winters, 2018; Moretti, 2004). Additionally, college graduates tend to be more civically engaged (the foundation of a democratic society such as the United States), tend to be healthier (potentially saving governmental outlays on social healthcare programs), and tend to be in more stable relationships (which could have important implications for their children's human capital accumulation) (Hout, 2012). Finally, increasing rates of college completion are associated with decreases in poverty and with increases in tax revenue (Whistle, 2019).

While there are strong economic arguments for increasing rates of college-going and degree completion, it is also important from a social equality perspective to close gaps in

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college-going and completion. Students from low-socioeconomic status backgrounds, historically underrepresented students of color, and first-generation students are less likely than their more economically advantaged, white or Asian, and continuing-generation peers, respectively, to enter a postsecondary institution and complete a degree (National Center for Education Statistics [NCES], 2015; Musu-Gillette et al., 2016; Cataldi et al., 2018). Income inequality has been increasing since 1978 (Saez & Zucman, 2016) and there is some evidence to suggest that increasing access to postsecondary education can reduce income inequality (Coady & Dizioli, 2018). Normatively, these gaps in college-going rates and rates of degree completion are *prima facie* unfair and counter to the American ideal of equal opportunity.

In this dissertation, I examine three distinct interventions, all aimed at increasing college access and degree completion. This work is predicated on the belief that a student's journey to a college degree is long and fraught with challenges. The first chapter takes a step back from students' decision of whether or not to attend college to examine an intervention that can potentially affect students' interest in and preparation for college in middle school. Prior research indicates that students have stable college aspirations by their first or second year of high school (Hossler, Braxton, & Coopersmith, 1989) and that gaps in college aspirations between continuing-generation and first-generation students increase in middle school (Anders & Mickelwright, 2015). Therefore, in the first chapter of this dissertation, I look at the impact of a college-focused intervention on eighth grade students' early preparation for college. This work is part of a longitudinal examination of whether an early intervention can improve rates of college-going among a larger, or different, population of students than is targeted by typical college access interventions, which tend to focus on high-achieving high school students. I present results from the first cohort of students participating in an experimental study that compares the

effect of visiting a college campus three times and receiving written information about postsecondary options to that of just receiving information about postsecondary options on students' knowledge about college, postsecondary intentions, college-going behaviors, academic engagement, and ninth-grade course enrollment decisions. The results suggest that experiencing various aspects of campus life in eighth grade improves students' knowledge about college, leads students to have more conversations about college with school personnel, leads students to exert greater effort on a survey task related to college, and decreases students' desire to attend technical school. Additionally, being selected for the field trips increases the likelihood students will enroll in advanced math and science/social science courses in ninth grade.

While the first chapter of this dissertation examines the importance of college-related experiences for putting students on a college-going path, the second chapter recognizes that college affordability is a major barrier to college access, even for students who are highly motivated to attend college. While there are positive returns to earning a college degree, even after accounting for student loan debt, the scale of student debt is staggering: in 2014, total federal student debt was over $1 trillion (Looney & Yannelis, 2015). Students often overestimate the cost of college and students from lower socioeconomic backgrounds, who are eligible for various forms of grant aid, may be the least informed about college affordability (Scott-Clayton, 2012). Private philanthropists and communities have attempted to increase college-going rates by drastically simplifying the process by which students can receive funding for college by establishing Promise programs. Promise programs guarantee a college scholarship to all students in a particular district or community who meet clear, easily communicated requirements. For example, the El Dorado Promise, established in 2007, guarantees a college scholarship to all students enrolled in the El Dorado School District for at least ninth through 12th grades. In the

second chapter of this dissertation, I estimate the impact the El Dorado Promise had on rates of postsecondary enrollment and degree completion. I use a quasi-experimental difference-in-differences design, comparing students who do and do not meet the Promise's eligibility requirement before and after the introduction of the Promise. I find that the announcement of the Promise does increase rates of postsecondary enrollment, particularly for students with below-average high school grade point averages and students of color. I also find that the Promise increases rates of bachelor's degree completion, especially for students with above-average high school grade point averages. There is no relationship between the introduction of the Promise and rates of associate's degree completion.

The results from the second chapter of this dissertation suggest that many students face financial barriers to college enrollment and to postsecondary degree completion; however, financial aid alone is not sufficient to support students once they enter college. In the third chapter of this dissertation, I explore how existing on-campus resources may support students as they transition to college and work towards degree completion using three distinct data sources and analytic approaches. First, using a nationally representative dataset, I show that students from socioeconomically disadvantaged families, first-generation students, and previously lower-achieving students are less likely than their socioeconomically advantaged, continuing generation, and higher achieving peers, respectively, to utilize academic services. These differences are troubling because the utilization of academic services is associated with an increased likelihood of second-year persistence and an increased sense of belonging on campus. I then use a more detailed survey at a single university to replicate and extend these findings. Using a convenience sample from at the University of Arkansas-Fayetteville, I again show that students with lower-income backgrounds and students with lower high school grade point

averages are less likely to use on-campus resources; I also show that students who are more extraverted, agreeable, or neurotic are more likely to use on-campus resources. Again, use of on-campus resources is associated with a greater sense of belonging on campus. Taken together, the results from these two surveys indicate that on-campus resources can provide a valuable service to students, but that differential usage rates could reinforce inequalities in rates of degree completion. Finally, to gain a more complete picture of how students learn of on-campus resources, why students use on-campus resources, and what barriers students face when attempting to use on-campus resources, I interview current undergraduate students at the University of Arkansas-Fayetteville. Thematic analysis of these interviews suggests that students view their professors and resident assistants as important information brokers on campus, but that the information they receive about on-campus resources is haphazard and inconsistent across faculty/staff. Additionally, a variety of logistical challenges, negative peer reviews, and personal stigmas prevent students from accessing the resources of which they are aware.

The three strategies for increasing rates of college-going and degree completion discussed in this dissertation address a common barrier: the postsecondary environment can be psychologically intimidating for many students. In addition to navigating the challenges of determining which institutions to apply to, finding ways to pay for college, and meeting admissions requirements, many students face the additional challenge of learning to navigate an entirely new social environment (Jack, 2014). Submitting a college application (or any application) is difficult, because a certain amount of vulnerability comes from opening oneself up to external judgment and evaluation. For students who identify with groups typically underrepresented on college campuses, that fear may be magnified because they may not know anyone who has attended college and may not be represented in the institution's marketing

materials (Glynn, 2017). This feeling of alienation from institutions of higher education could make it less likely that students from historically underrepresented groups, whether students from low-income families, students of color, students from rural areas, or first-generation students, will apply to or attend college. Additionally, even for students who do enroll in postsecondary education, these psychological barriers may persist, potentially making it difficult to attend office hours or to ask for help in a tutoring center (Jack, 2014; Jack, 2015). In this dissertation, I examine three interventions that may help address this type of psychological barrier, of feeling alienated from institutions of higher education. The campus visits project, described in the first chapter, aims to help students feel more comfortable on a college campus at an early age, so college can seem like more of a realistic possibility. The El Dorado Promise, described in the second chapter, sends a clear message to students throughout their K-12 experience that preparing for college is not a waste of time, because they have a guaranteed way to pay for college. Student support services, discussed in the third chapter, are in a position to either disrupt or reinforce stereotypical notions of "who belongs" on a college campus. Ultimately, this dissertation suggests that when thinking about college access and completion, it is important not only to consider the college-going process holistically, but also to consider nontraditional barriers to postsecondary education.

Increasing rates of college enrollment and degree completion is a pressing policy issue with both economic and normative implications. While numerous barriers to postsecondary access, such as informational failures, high costs, and inadequate academic preparation, have been discussed in prior literature, we still know little about how psychological barriers can also prevent students from attending and thriving in a postsecondary environment. The three chapters of this dissertation suggest that while there are significant challenges to achieving these goals,

there are promising interventions and policies school leaders, policymakers, and universities can pursue to improve student outcomes. Schools and college recruitment offices can work together to organize field trips to familiarize students with college early on. District officials and community officials can work together to fund place-based scholarships and create a college-going culture to make college a financially realistic option for students; state and federal "free college" initiatives may also be a promising policy lever to increase college-going and completion rates. Finally, universities should study the extent to which students are utilizing on-campus resources and make such resources more accessible to students by investing in advertising efforts, ensuring faculty and other staff know of the different resources available on campus, and making it logistically easy to utilize on-campus resources.

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Chapter 1: An Evaluation of the Educational Impact of College Campus Visits: A Randomized Experiment[1]

I.   Introduction

Increasing access to higher education is a serious policy concern at both the state and federal levels, given positive economic returns to postsecondary education (Oreopoulos & Petronijevic, 2013) and the potential for postsecondary education to lead to social mobility (Chetty et al., 2017). While the total share of students entering higher education has increased since 2000 (National Center for Education Statistics, 2018), a 19-percentage point gap remains between the postsecondary enrollment rates of would-be first-generation and continuing-generation students[2] (Cataldi, Bennett, Chen, & Simone, 2018). In this paper, we study the degree to which visits to a college campus during eighth grade can reduce barriers to college access, especially for historically underrepresented, would-be first-generation students.

Many policymakers and researchers have responded to the issue of inequitable college access primarily by intervening with high school students and focusing on clear barriers to college access. For example, the state of Arkansas covers the cost of the ACT exam for all 11th grade students and Tennessee offers full tuition for high school graduates who attend community colleges. While these interventions may help students who want to attend college but lack the means to do so, many students determine their postsecondary aspirations by their freshman or sophomore year (Hossler, Braxton, & Coopersmith, 1989). Further, there are widening gaps in postsecondary aspirations between would-be first-generation and continuing-generation students

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[1] This paper was co-authored with Katherine Kopotic, Gema Zamarro, Jonathan N. Mills, Jay P. Greene, and Gary Ritter

[2] We define first-generation students as students whose parents have not received any type of postsecondary education. Continuing-generation students have at least one parent who has received some type of postsecondary education.

that develop when students are in middle and high school (Anders & Mickelwright, 2015). Thus, an intervention aimed at increasing students' motivation for postsecondary education prior to entering high school is particularly well-situated to increase the pool of students who are interested in attending college and shape students' long-term educational decisions.

The psychological and sociological literature has long recognized that first-generation students may lack the "cultural capital," or cultural knowledge and social assets (Bourdieu, 1977), necessary for navigating universities' complex formal and informal systems they face when applying to and attending college (Swidler, 1986; Lareau, 1989; Collier & Morgan, 2008; Hamilton, Roksa, & Nielsen, 2018). Even if students possess the financial resources and information necessary to attend college, they may be less likely to enroll if they feel they would not belong on a college campus. Given how little exposure historically underrepresented students have to college campuses or to individuals who have had those experiences, the college environment might be very psychologically intimidating to these potential students. Di Maggio's (1982) cultural mobility theory posits that students can acquire cultural capital from outside the family, suggesting that a school-based intervention may be able to give students the necessary cultural capital to feel confident in preparing for, applying to, and being successful in an institution of higher education.

We examine the impact of three field trips to a college campus during the eighth grade using a randomized experimental design. Specifically, we provide randomly assigned treated students with information about postsecondary options and organized field trips that expose students to various aspects of college life, while randomly assigned control students receive packets with the same information at their schools. We hypothesize that the experience of visiting a college campus multiple times, interacting with students and faculty, and participating

in college-readiness programming will have a greater impact on students' college-related decisions than simply receiving a packet of information with no follow-up or interpersonal interaction along with the information. This paper examines the immediate effects of these field trips on students' knowledge and attitudes towards college, school engagement, measures of non-cognitive skills, as well as ninth grade course enrollment within one year of the intervention. Through survey instruments, we find that students assigned to participate in the field trips demonstrate higher levels of knowledge about college, higher levels of conscientiousness when completing the survey, a higher likelihood of having conversations with school personnel about college, and a decreased desire to attend technical school. Our analysis of students' ninth grade course enrollment indicates students assigned to the campus visits are more likely to enroll in accelerated math courses, such as pre-AP Algebra or pre-AP Geometry, and are more likely to enroll in accelerated science and social studies courses, such as pre-AP Biology or pre-AP Civics.

The rest of this chapter proceeds as follows: Section II discusses commonly theorized barriers to college access and the impacts of interventions addressing those barriers, Section III describes our intervention, Section IV explains our analytic strategy and sample, Section V presents our results, and Section VI concludes.

II.   Prior Literature: Barriers to College Access and Potential Interventions

Barriers to college entry identified in the literature fall generally into three categories: a lack of financial resources, a lack of information about college costs/benefits or the college application and matriculation processes, and a lack of preparation for college (Page & Scott-Clayton, 2016). While interventions addressing these barriers have successfully increased postsecondary access, we hypothesize that a lack of familiarity with college experiences poses a

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non-trivial, yet often overlooked, barrier to college entry. Further, prior interventions have focused primarily on high school students, when many students have already fallen off a college track while still in middle school (Wimberly & Noeth, 2005), or on "promising" students (as identified by teachers), which could limit the magnitude of an intervention's impact (Seftor, Mamum, & Schrim, 2009). We argue that intervening earlier, when students are in eighth grade, and with students of all academic backgrounds, could enlarge the pool of students successfully preparing for and eventually accessing college.

Numerous programs provide students with financial aid to make college affordable. Financial aid programs with various designs can increase college enrollment (Kane, 2003; Cornwell, Lee, & Mustard, 2005; Cornwell, Mustard, & Sridhar, 2006; Bettinger, 2004; Goldrick-Rab, Harris, Kelchen, & Benson, 2012; Page, Iriti, Lowry, & Anthony, 2018; Daugherty & Gonzalez, 2016; Bartik, Hershebein, & Lachoska, 2017; Swanson & Ritter, 2018). However, financial aid is limited in terms of its ability to promote college access and success. First, students often must complete complicated paperwork to apply for the aid, which creates its own barriers, as discussed below. Additionally, financial aid is often awarded late in a student's journey to college; typically, students do not know the details of their aid package until after they have been accepted into a particular institution. This uncertainty may deter students from applying to universities with a high sticker cost or from accepting an offer of admittance (Kelchen & Goldrick-Rab, 2015). Additionally, financial aid programs can induce under-matching, whereby students who would have been successful in four-year universities enroll in two-year colleges because of the available aid (Carruthers & Fox, 2016).

Information failures can also derail a student's postsecondary plans. Students, particularly those from low-income families, may lack important information about the college application

and matriculation processes, such as how to complete the Free Application for Federal Student Aid (FAFSA), or how to decide to which colleges to apply (Hoxby & Avery, 2012; Avery & Kane, 2014). Further, information failures, such as not knowing where to send proof of vaccinations, can occur after a university admits a student, leading admitted students to fail to matriculate at their chosen university (Castleman & Page, 2014). Providing students with information about the college application and matriculation processes can increase rates of applying to and enrolling in college (Barr & Turner, 2017; Hoxby & Turner, 2013; Page & Gehlbach, 2017). Additionally, having current university students visit high schools to talk about the college process can increase enrollment at selective institutions (Sanders, 2018). However, like financial aid, interventions providing information are limited in the extent to which they can affect postsecondary decisions (Bettinger, Long, Oreopoulous, & Sanbonmatsu, 2009), in part because they often lack meaningful interpersonal interactions (Carrell & Sacerdote, 2017).

In addition to facing informational and financial barriers, students may also struggle to matriculate at a postsecondary institution because of inadequate academic preparation (Avery & Kane, 2014; Gonzalez, Bozick, Tharp-Taylor, & Phillips, 2011). This problem may be particularly acute for would-be first-generation students; Cataldi et al. (2018) find that would-be first-generation students are less likely than continuing-generation students to take advanced math, AP, and IB courses in high school, even though these courses may be particularly beneficial in the college application process.

While researchers consistently find that comprehensive interventions addressing overlapping barriers to college success increase postsecondary enrollment and persistence (Oreopoulos & Petronijevic, 2016; Carrell & Sacerdote, 2017; Castleman & Goodman, 2018; Castleman & Page, 2015; Oreopoulos, Brown, & Lavecchia, 2014; Carruthers & Fox, 2016), the

interventions are often difficult to scale, expensive, and tend to focus on high school upperclassmen.

We hypothesize that a lack of cultural capital inhibits postsecondary access and completion for many students. Cultural capital (Bourdieu, 1977) includes knowledge, such as understanding the usefulness of office hours, and social assets, such as having access to a professional network to find an internship. Cultural capital affects students' schooling outcomes, including academic performance, college enrollment, and educational attainment (Swidler, 1986; Lareau, 1989; Hamilton, Roksa, & Nielsen, 2018). A lack of cultural capital and familiarity with college can alienate historically underrepresented students from postsecondary opportunities, leading students to eschew an academic track in high school, disengage from school, and attain and retain less information about how to obtain a postsecondary degree. Sociology's cultural mobility theory (Di Maggio, 1982) argues that sources outside the family can promote cultural capital, suggesting that school-based interventions could increase college access by increasing students' cultural capital. The literature examining barriers to college access has largely overlooked a lack of cultural capital as an important barrier for students and few studies have examined whether school-based interventions aimed at increasing students' familiarity with college can impact students' postsecondary outcomes.

Although most interventions designed to improve college access focus on high school seniors, there is reason to believe that intervening when students are in late middle school or early high school could benefit students' postsecondary outcomes. First, students begin making decisions that affect their postsecondary outcomes relatively early in their educational careers, including in middle school (Hossler, Braxton, & Coopersmith, 1989; Wimberly & Noeth, 2005; Klasik, 2012). Second, non-cognitive skills such as grit and conscientiousness seem malleable in

early adolescence (Hoechsler, Balestra, & Backes-Gellner, 2018), and are predictive of education attainment (Almlund, Duckworth, Heckman, & Kautz, 2011; Hitt, Trivitt, & Cheng, 2016) and career choices (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). Third, and intuitively, intervening before students have made decisions about what courses to take in high school and before they have contributed to their high school GPA means that if the intervention changes students' aspirations, they will not have to make up for a prior low grade or regret having taken less rigorous coursework. However, a college-focused intervention that occurs too early could fail to resonate with the student, or the student could forget what they learned by the time they reach high school and start making college-relevant decisions. Thus, we argue that intervening when a student is in eighth grade could be particularly effective for altering students' postsecondary trajectories: they are close enough to high school for the information to resonate, but far enough away from postsecondary matriculation that all options are still open.

In this paper, we test whether an early intervention (in eighth grade) aimed at increasing cultural capital (by familiarizing students with a college campus) can affect students' college knowledge and motivation, academic engagement, conversations about college with school personnel, and ninth grade course load. This work addresses two gaps in the literature: first, examining the extent to which a lack of familiarity with college presents a barrier to college access; and, second, examining whether a relatively early college-focused intervention, targeting the general population of eighth graders in a school, can affect students' college-going attitudes and decisions.

III.   Intervention

Our intervention involves randomly assigning eighth grade students to one of two conditions. We arrange three field trips to a flagship public university for students in the

treatment condition; the research team fully covers the cost of these trips, including transportation, meals, and chaperones. These visits represent various facets of the college campus experience and are designed to make students feel comfortable being on a college campus as well as with the idea of one day being a college student. Additionally, students in both the treatment and control groups receive college information packets at the beginning of the spring semester in 2018. We then test the impact of visiting a college campus and receiving information relative to only receiving information about college on paper. We hypothesize that the acquisition of cultural capital through the concrete experience of visiting a college campus will leave a more profound and lasting impression on students than will access to written information about postsecondary options.

Specifically, we hypothesize that the field trips will increase students' knowledge of college above what students may learn from written materials about postsecondary options. We argue that having information delivered in person, from engaging presenters and particularly from current undergraduate students with similar backgrounds as participating students, will help students retain information better than having access to written information they may or may not read and engage with. Further, we hypothesize that as students interact with campus staff, faculty, and students in both formal and informal settings on campus, they will demonstrate an increase in perspective taking. Additionally, we think that hearing from students with similar backgrounds and learning of some of the support systems in place on campus for students will increase students' sense of college efficacy.

We also hypothesize that the field trips will positively affect students' academic engagement, conscientiousness, grit, self-management, and likelihood of enrolling in advanced coursework. We argue that if eighth grade students hear from university students about the

amount of work, personal responsibility, and persistence it takes to be successful in college, they will be more engaged in school and seek out academic challenges in order to be better prepared for college. Further, we argue that, through their experiences with academic departments, students will gain a better understanding of the types of content they can study in college and the high expectations they will have to meet to be successful in college. Similarly, we hypothesize that if students are prompted to start thinking about what it will take to be prepared for college, they will be more likely to have additional conversations about college with school personnel, parents, and others who can advise them throughout the process of preparing for, applying to, and entering college. Finally, we hypothesize that students' increased familiarity with a college campus will help reduce psychological barriers to college, potentially shifting their postsecondary aspirations. In addition to shifts in attitudes towards college and college-related non-cognitive skills, we expect to see a behavioral impact of the visits as well; specifically, we hypothesize that students will be more likely to take advanced coursework because of the visits.

A brief description of each visit follows. For more detailed information, see Appendix A.

Visit One: The first campus visit included a college information session and campus tour. The eighth-grade students arrived on campus and met with Student Ambassadors from the college admissions office for a tour that highlighted campus traditions, history, and unique buildings. The students then participated in a workshop developed by staff at the university's College Access Initiative that discussed what college is, how to prepare for college, and how to succeed in college. The students learned skills that will set them up for success when applying to colleges, including study tips, the importance of enrolling in challenging classes and participating in extra-curricular activities in high school, and different resources available to them as high school students. Current undergraduate students shared their experiences and the

visiting eighth-grade students were able to ask questions about college life. To conclude the first visit, students ate lunch in an on-campus dining hall to familiarize them with a social aspect of campus life.

Visit Two: The second visit to campus focused on exposing students to different departments and degree paths available at the university. Students took a tour of housing options available on campus, which included a model dorm room and common areas standard in community-style housing halls. Following their tour of housing, the students participated in an engineering presentation. Current students described various engineering subfields and their associated career paths. The engineering students then tasked the eighth graders with a construction challenge appropriate for their age. Following the engineering activity and lunch, students broke into smaller groups and visited one other department on campus.[3] The participating departments included English, architecture, economics, nursing, the Volunteer Action Center, astronomy, University Recreation, and theater. Each department organized a content-specific activity for the students.[4]

Visit Three: The final visit aimed to foster a sense of campus spirit. Participating schools chose to either attend an official university baseball game held on a Saturday afternoon or to compete in an on-campus scavenger hunt organized by the research team.

Information Packet: All participating students, in both the treatment and control conditions, received an information packet at the beginning of the spring semester; for treated students, this fell between their second and third visits. The packet included a list of the postsecondary institutions in the state as well as their websites, physical locations, and contact

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[3] Students from large schools were able to choose which department they visited, while students from smaller schools remained as one group and all visited the same department. Departmental options varied by day, based on when faculty/graduate students within each department were available to host students.

[4] Detailed descriptions of each visit are available in Appendix A.

information; a checklist of things to do in each grade in high school to prepare for college; and information about different types of occupations, including educational requirements and expected salaries. All information provided in the information packet was available online.[5] Finally, the folder included a personalized cover letter describing the information students received. The research team compiled the packets, which school personnel distributed.

IV.   Sample and Analytic Strategy

A. Recruitment and Randomization

Fifteen schools participated in this study in the 2017-18 school year. We initially reached out to schools within a two-hour drive of the university where students of color comprised at least 50 percent of the study body or where students receiving free or reduced-price comprised at least 60 percent of the study body. One district asked that we include all junior high schools in the district in the study; because of this request, we did include one school at which the share of students receiving free or reduced price lunch was below 60 percent and the share of students of color was below 50 percent.

The closest school to the university is within a 10-minute drive, while students at the farthest school have to travel about 90 minutes to reach campus. Schools vary greatly in size, with the total number of eighth-grade students within each school ranging from about 50 students to about 500 students. The share of students receiving free- or reduced-price lunch within each school ranges from 49 percent to 85 percent, while the share of students of color ranges from six percent to 85 percent. The majority of students in our sample are would-be first-generation college students; 52 percent of students report that neither of their parents holds either a two or

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[5] Information on postsecondary options were available through the state's department of education. Preparation checklists were available here: https://www.petersons.com/blog/college-planning-timelines/. Information about career pathways was available here: https://www.bls.gov/k12/content/teachers/posters/posters.htm.

four-year degree, and only 13 percent of students report that both of their parents have earned at least a four-year college degree. At baseline, prior to randomization, 56.6 percent of students report they intend to attend a four-year college after high school, with 12.5 percent intending to attend a community college, 12.5 percent undecided, and the remaining 18.4 percent split between wanting to find a job, enter the military, attend technical school, or pursue some other option. Slightly less than half of the students in our sample have never visited a college campus prior to this intervention, which is remarkable given the relative proximity of the schools to campus. Six schools are located in urban areas, while the remaining nine are in rural communities.

We use a straightforward block randomized experimental design for this analysis. Students are randomly assigned to either the treatment (campus visits and information) or control (information only) group within their schools.[6]

B. Data

At the beginning of the 2017-18 school year, consent forms were sent home with all eighth-grade students in all participating schools. Across all 15 schools, 885 students agreed to participate in the study. We surveyed students at the beginning of the fall semester, prior to randomization, in order to collect baseline measures of student characteristics and outcome constructs; we were able to survey 88 percent of students who opted into the study. The surveys took students between 20 and 40 minutes to complete. At the end of the spring semester, after all the campus visits and after all students received the information packets, we surveyed

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[6] We used STATA's *randomize* command to run 100 randomizations within each school and automatically select the randomization that achieved the best balance on dichotomous indicators for student gender and race, as is recommended given the relative small number of students we observe within any given school (Bruhn & McKenzie, 2009).

participating students a second time in order to collect our outcome measures. We were able to

survey 73 percent of participating students.[7] In this section, we describe our main outcome

variables derived from the student survey and show how our randomization procedure achieves

balance on average observed characteristics between our treatment and control groups.[8]

Our first outcome of interest is students' knowledge of basic, college-related information

because we anticipate that the experience of visiting a college campus will help students retain

more information than simply receiving the information on paper in school. In the baseline

survey, students are assigned one of two versions of a set of 14 college knowledge questions.

Each set consists of a series of true or false and multiple choice questions that ask, for example,

what type of courses available to students in high school could result in college credit and the

main difference between community colleges and four-year universities. All students respond to

the same 11 items on the spring survey, four of which are new to the knowledge construct. The

spring survey questions include both yes/no questions as well as some open-ended questions.

Topics covered in these questions include the average cost of attendance for an in-state student at

the state's flagship university and which factors universities typically consider when making

admissions decisions.

All the knowledge questions are original to this project. Thus, we use item response

theory to test the extent to which our knowledge questions discriminate among different levels of

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[7] Treated students were about 10% more likely to complete an end-of-year survey than control students, a difference that is statistically significant at the 90% confidence level. The overall and differential attrition rates we observe would still place this study within the liberal attrition standards declared by IES WWC standards for valid RCT studies (https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_brief_attrition_080715.pdf).
[8] All information related to student demographics and baseline attitudes towards college are drawn from our fall (pre-randomization) survey; we are not able to test for balance for students who did not complete an initial survey. Students who did not complete a survey were still randomized to either the treatment or control condition. We attempted to survey all students at the end of the year who participated in the project, including those who did not complete a baseline survey. Sixty-six students (7% of our sample) completed a spring survey but did not complete a baseline survey.

knowledge about college and are appropriately difficult for students in our sample. Our analyses indicate six items on our baseline survey and four questions in the spring survey are not able to discriminate in our sample and are eliminated from our college knowledge measure. We then build measures of knowledge about college for the baseline and spring surveys as the percentage of correct responses on a scale from zero to one, with one indicating a 100 percent correct.[9]

The second set of outcome variables measures students' non-cognitive skills, also referred to as socioemotional skills, psychosocial skills, and character skills (Duckworth & Yeager, 2015). We include two behavioral proxy measures of student conscientiousness through the effort students put forward on the surveys: careless answering (Hitt, 2015) and item non-response (Borghans & Schils, 2012; Hitt, Trivitt, & Cheng, 2016; Zamarro, Nichols, Duckworth, & D'Mello, 2018). Recent literature has found that these survey effort measures are good proxy measures of character skills related to conscientiousness and are significant predictors of important academic and life outcomes (Marcus and Schütz, 2005; Hitt, 2015; Huang et al., 2012; Johnson, 2005; Meade and Craig, 2012; Zamarro et al., 2018). Additionally, we include self-reports of college efficacy (Gibbons & Borders, 2010), grit (Duckworth, Peterson, Matthews, & Kelly, 2007), self-management (Panorama, 2018), and perspective taking (Davis, 1980). Finally, we include two original measures of academic engagement. We calculate Cronbach's alpha for each construct to check its reliability within our specific sample. Table 1 presents a summary of our constructs, including a sample item and Cronbach's alpha. All our constructs, except our

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[9] We randomly assigned students to one of two versions of the knowledge questions on the fall survey; we retained eight items from version A and five items from version B. All students responded to the same survey in the spring; we retained seven items for that analysis.

second measure of academic engagement[10], have an alpha of at least 0.6, indicating that these scales present reasonable reliability within our sample.

We next look at two initial measures of college-going behaviors aiming to capture the degree to which students have conversations about college with school personnel and parents. Our first scale measures the average frequency of conversations students report having with school personnel and combines students' responses across eight dimensions: admissions requirements for two-year colleges and four-year universities, how to decide which institution to attend, their likelihood of being accepted to different types of schools, what ACT/SAT scores they will need for likely college admission, opportunities to go to college out-of-state, readiness for college-level coursework, study skills required for postsecondary education, and how to pay for college. Students respond on a zero (No), one (Yes, Once) to two (Yes, multiple times) scale. This scale presents high reliability in our sample with an estimated alpha of 0.8. Our second measure is obtained from students' responses to a single item, which asks if they have ever talked to their parents about college. Students, in this case, respond on a zero (Never), one (Once or twice), two (A few times) to three (All the time) scale.

We also study the impact of our intervention on students' reported postsecondary intentions. On the survey, we ask students the following question: "If I had to decide right now, after I graduate high school, I plan to…". Students are prompted to choose one of six responses: attend a two-year or community college; attend a technical/vocational school; attend a four-year college; enter the military full-time; find a job, or other. We look at each of the five defined

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[10] The items included in this construct asked students about time use: "In a typical 7 day week during the school year, about how much time do you do the following outside of school?—Completing homework for class; Studying for tests or quizzes; and Reading for your own personal interest (books, magazines, newspapers, online articles, etc."

options as a dichotomous outcome to determine if the campus visits affect students' likelihood of intending to follow each of these paths.

Additionally, students self-report their demographic information, including gender and ethnicity, participation in the federal TRIO program, prior exposure to college campuses, and current grades. We also include a measure of socioeconomic status based on the Programme for International Assessment (PISA)'s index of economic, social, and cultural status (OECD, 2012). Through our collection of administrative data from the schools, we recover some missing responses on questions of student gender and race.

Finally, we use information from district administrative records to determine whether the program affects students' ninth-grade course-taking decisions. While the majority of courses students take in ninth grade are determined by their school, students are able to choose whether to take pre-Advanced Placement (AP) or honors courses instead of regularly-paced courses. We collect transcript information from participating districts to determine whether treated students are more likely than control students to enroll in pre-AP or honors courses for their core subjects (math, English, and science/social studies). We code a course as "advanced" if it includes "advanced", "honors", "pre-AP", or "AP" in the course name that the district provides. Given the data we observe, it appears every participating school offers advanced English courses in ninth grade, but four schools do not offer advanced math courses and a different group of four schools does not offer advanced science or social studies courses. Overall, 17 percent of participating students across all schools enroll in an advanced math course in the first semester of their ninth grade year, 26 percent enroll in an advanced English course, and 17 percent enroll in an advanced science or social studies course.

Table 2 presents summary statistics and tests of balance for our sample based on our fall (baseline) survey. To test for within-school balance, we regress each variable on an indicator for treatment status and a vector of school indicators. As shown in Table 2, we achieve balance on all observed characteristics except our college efficacy construct. We see that, at baseline, students who are later randomized to participate in the campus visits report higher feelings of college efficacy by 0.08 points on a four-point Likert scale. Note, however, that we are performing multiple hypothesis tests in our check for balance, so we would expect about one false positive given a five percent Type I error rate. Nevertheless, to be conservative, we present the estimated effects of the intervention controlling for baseline measures of college efficacy as a robustness check.

C. Empirical Approach

We estimate the intent-to-treat (ITT) effects of the campus visits relative to only receiving an information packet. Reports from school staff indicate limited absences for the first two visits; however, poor weather conditions led to relatively low attendance rates for the third visit.[11] Given these absences, our ITT estimates represent lower bounds of the effects of the intervention. Our main empirical model is as follows:

$$(1) \quad Y_i = \beta_0 + \beta_1 T_i + \tau_s + \varepsilon_{is}$$

Our outcome variable, Y_i, is, in turn, two self-reported scales of academic engagement, two behavioral proxy measures of conscientiousness, self-reported college efficacy, college knowledge, self-reported grit, self-reported perspective taking, and self-reported self-management. In our analysis of ninth grade course enrollment, Y_i is a dichotomous variable

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[11] Unfortunately, we do not have detailed records that would allow us to estimate dosage effects of attending all three visits instead of one or two visits. Our lack of attendance records also makes it difficult to estimate the share of students who missed the third visit.

indicating whether or not the student enrolls in at least one accelerated course in the fall semester

of their ninth grade year as well as at least one accelerated course in the areas of math, English

and, science/social science separately. T_i is a dichotomous variable indicating whether student i

is assigned to participate in the field trips, τ_s is a vector of school fixed effects, and ε_{is} is a

stochastic error term clustered at the school level.

Our coefficient of interest, β_1, captures the causal relationship between being assigned to

participate in the field trips and a given outcome. Given our randomized experimental design,

our model should not need further demographic controls to estimate the causal effect of being

assigned to attend the campus visits. Further, as we demonstrate above, our treatment and control

groups are generally balanced on observable characteristics, so we do not suspect there would be

a reason for the two groups to differ on any unobserved characteristics. As a robustness check,

we also present results for all analyses in which we control for student race and gender in

Appendix B. Results are similar to the ones we present here without such controls.[12]

One potential threat to the validity of our experimental design is the possibility of

treatment crossover, whereby students not assigned to the visits decide to visit a college campus

on their own. However, the programming students participate in through this project is in many

ways unique, limiting the concern that students will access the full treatment experience on their

own. Additionally, we ask students on our baseline and spring survey whether they have visited a

college campus. Despite being within a relatively easy driving distance of the state's flagship

university, we find that, at baseline, 44 percent of responding students report never having

visited a college campus. In the spring, 33 percent of responding students from the control group

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[12] Our preferred model does not include these controls, as their inclusion leads to a slight sample reduction due to missing data, and, as we are able to demonstrate baseline equivalence, these controls are not necessary for causal identification.

report never having visited a college campus, compared to less than five percent of responding students from the treatment group. While the treatment may have induced some control students to visit a college campus on their own, we retain a distinct treatment-control contrast for our analysis.

The outcome measures presented in this chapter are derived from student responses on the spring survey as well as administrative records as described in section IV.B. above. These measures are summarized in Table 3. Note that our outcome variables from the spring survey are measured on different scales. Careless answering is a standardized measure, item non-response and college knowledge are percentages (share of skipped items or share of correct responses, respectively), self-reported non-cognitive skills are on scales of one to four or one to five, postsecondary intentions are dichotomous variables, and conversations with school personnel and parents are on zero to two and zero to three scales, respectively.

V.   Results

We first present results from our analysis of the student survey administered in the spring of the 2017-18 school year, about three months after students received the information packets and about one month after the final campus visit.[13] Table 4 presents results from our model, described in equation (1), which includes an indicator for treatment assignment and school fixed effects. We find that being assigned to the campus visits leads to a 3.3 percent (0.1 standard deviation) significant increase in the share of correct responses on the college knowledge section of the survey relative to being assigned to just receive a packet of information about postsecondary options and preparation at school.

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[13] Depending on school, the fall survey was administered in August or September 2017 while the spring survey was administered in April or May 2018.

Being assigned to attend the campus visits also leads to a 9.7 percent (0.2 standard deviation) reduction in item non-response on the spring survey, an effect that is statistically significant at the 90 percent confidence level. When students visit campus, they hear from current undergraduates about the importance of time management, attention to detail, persistence, and responsibility for college success. Additionally, on their second visit, students complete intricate, challenging tasks with different departments. These experiences could lead to an increase in conscientiousness, which we measure through item non-response rates on our spring survey. While psychologists typically define conscientiousness as a global personality trait (Mcrae & Costa), certain contexts, such as school, may be more conducive to expressions of a particular facet of conscientiousness, such as industriousness or conventionality (Roberts, Lejuez, Krueger, Richards, & Hill, 2014), that relate to students' behavior on a survey task.

We also find that students assigned to the campus visits increase their reports of conversations with school staff about college. We find a statistically significant increase in the frequency of conversations of 0.07 points (0.1 standard deviation). This increase in the likelihood and number of conversations about college could push students to take more "college preparatory" courses, learn more about various college options, and ultimately find a better match for their postsecondary institution.

Finally, we find that participating in the visits leads to a 3.4 percentage point decrease in the likelihood a student will report planning to attend a technical school after graduating from high school. However, there is no corresponding significant increase in the likelihood of intending to find a job, enter the military, attend a community college, or attend a 4-year university. Further, only about two percent of students overall in the spring indicated they intend

to attend a technical school, so a decrease of three percentage points is a small shift. We find no impact of the field trips on our other measures of non-cognitive skills, behaviors, or intentions.

In our test for baseline balance within schools, described in section IV.B, we see that students later assigned to participate in the campus visits report slightly higher feelings of college efficacy at baseline. Thus, as a robustness check, we run the same parsimonious model but control for baseline reports of college efficacy in addition to treatment assignment and school fixed effects. Standard errors are again clustered at the school level. Our results, presented in Table 5, are largely consistent with the findings from our main model. We find a significant, positive impact of the visits on students' college knowledge, although it is slightly larger in magnitude than the effect from our preferred specification (4.6 percent as opposed to 3.3 percent). Similarly, we find a slightly larger reduction in item non-response (11.5 percent as opposed to 9.7 percent) when controlling for baseline college efficacy; this effect remains statistically significant. We also continue to see a slight reduction (3.5 percentage points) in the likelihood that a student reports intending to attend a technical school after high school; this effect is significant when controlling for baseline college efficacy. However, when we control for baseline college efficacy, we no longer see a significant impact of the trips on the likelihood or frequency that a student will engage in conversations about college with school personnel. The point estimate remains positive (0.05 points on a three-point scale), but it is not statistically significant at conventional levels. We continue to see no statistically significant impacts of the intervention on our other measures of student non-cognitive skills, postsecondary intentions, or behaviors.

We turn now to our analysis of students' ninth-grade course enrollment decisions. We have administrative data from 14 of our 15 participating schools. We began with 780 students

enrolled in those 14 schools and we were able to collect transcript information for 708 (91%) of those students. We also observe little differential attrition in the administrative data based on treatment status; 92 percent of treated students are observed in the administrative data, as are 89 percent of control students.

We use an analogous model for our analysis of course-taking as we do for the analysis of our survey-based outcomes, including school fixed effects and an indicator for whether or not the student is assigned to participate in the campus visits. These results are presented in the top panel of Table 6. We find that students assigned to the campus visits are 6.4 percentage points more likely to enroll in advanced math coursework than are students who only received written information about postsecondary preparation and options. Additionally, we find that students assigned to the campus visits are 6.1 percentage points more likely to enroll in advanced science or social studies courses than students who only received the information packet. Both effects are statistically significant at the 90% confidence level. We find no statistically significant impact of the visits on the likelihood that students enroll in advanced English coursework or on the likelihood that they enroll in any type of advanced coursework when courses are aggregated together. In the bottom panel of Table 6, we add a control variable for baseline college efficacy. When we control for baseline college efficacy, we see no statistically significant impact of the campus visits on students' ninth grade course-taking; point estimates remain positive, but are smaller in magnitude and are less precise than when we do not include baseline college efficacy as a control.

A. Differential effects for first generation students

One of our guiding hypotheses in this work is that college can be psychologically intimidating to students. This might suggest that students who have had less exposure to the

college environment or who might have more limited access to others who have gone to college would experience a greater impact of the visits than students who have had relatively more exposure to the college environment. In particular, would-be first-generation students may be differentially affected by the campus field trips because the exposure is particularly novel.[14] We test this hypothesis by interacting our main treatment indicator with an indicator of whether or not the student reports their parent has earned a two or four-year degree, which is how we define first-generation status for this analysis. We do lose part of our sample for this analysis, as 17% of students did not report either parent's education level on our survey. Descriptively, we see that there are differences in postsecondary intentions between would-be first-generation and continuing-generation students. Specifically, at baseline, the share of first-generation students intending to pursue a four-year degree after high school is over eight percentage points less than the share of continuing-generation students intending to pursue a four-year degree. When we include two-year degrees, the share of first-generation students intending to pursue a postsecondary degree is about three percentage points less than the share of continuing-generation students intending to pursue a postsecondary degree.

We find limited evidence to suggest that first-generation students are differentially affected by assignment to the campus visits; our full results are presented in Appendix C. In our preferred, parsimonious model, we find that treated first-generation students report lower levels of academic engagement on a survey scale of engagement that includes items such as "I feel proud being a part of this school" and "Good grades are important to me" than treated continuing

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[14] In an alternative test of this hypothesis, we examine whether students who have and who have not previously visited a college campus are differentially affected by the campus visits. In general, we find no evidence to suggest there are differential effects of the treatment based on students' prior exposure to a college campus. We find only one significant finding: students who had visited a college campus prior to participating in the study are 9.6 percentage points less likely to report wanting to find a job immediately after high school than are treated students who have never visited a college campus prior to the intervention. Full results are available upon request.

generation students by 0.336 standard deviations. This effect is statistically significant at the 95% confidence level and robust across model specifications. Similarly, we find that treated first-generation students report lower levels of self-management (0.368 standard deviations) than treated continuing-generation students; this effect is statistically significant at the 95% confidence level and is robust across model specifications. Additionally, treated first-generation students skip 9.3% more items than treated continuing-generation students; this effect is statistically significant at the 90% confidence level, but disappears when we control for student demographics and baseline college efficacy. Finally, we see a differential impact of the visits on first-generation students' college intentions. Specifically, we find that, similar to the overall effect, first-generation students are 5.0 percentage points less likely to intend to attend a technical school after college. However, unlike in the overall effect, we find that treated first-generation students are 8.4 percentage points more likely to report wanting to attend a community college after high school. We find no evidence of a differential effect of assignment to the visits on college-going behaviors, or course enrollment by first-generation status.

These preliminary results suggest that experiencing a college campus for the first time may have an initial discouraging impact on first-generation students as they gain a more complete understanding of the challenges of pursuing a college degree. However, we find no evidence to suggest that the visits discourage first-generation students from taking specific actions to prepare for college, such as enrolling in advanced coursework in ninth grade. Further, we find assignment to the visits is associated with an increased desire to attend a community college for would-be first-generation students. This pattern of results may indicate that students can overcome the initial shock or anxiety about college and become more determined to prepare for college once they have had more time to process the visits. As we continue to analyze

students' college preparatory actions throughout high school in future iterations of this study, we will be able to determine whether these initial negative effects on academic engagement, academic diligence, and self-management for first-generation students are transitory or persistent.

VI.   Discussion and Conclusion

Postsecondary access is a concern for policymakers, researchers, parents, and individual students across the country. Past work has focused on the role of financial aid, information, and assistance navigating bureaucratic processes, while relatively little work has examined the role of a lack of experience with college in students' postsecondary planning processes. In this study, we provide some of the first scientifically rigorous evidence that efforts to improve students' cultural capital through field trips to a college campus could improve students' knowledge about college and academic diligence (measured by item non-response) above the effect of providing information about college. We also find that campus visits may make students more likely to engage in conversations about college options and preparation with school personnel. Further, we find suggestive evidence that students assigned to the campus visits are more likely to enroll in advanced courses in math and science/social studies.

As one of the first experimental evaluations of an experience-based intervention aimed at improving students' college-going outcomes, this study makes an important contribution to the literature and our understanding of the barriers students face when making postsecondary decisions. However, given the preliminary and exploratory nature of this work, there are also several limitations of the current study that should be addressed in future work.

First, given the lack of research examining the impact of experiences on students' college-related outcomes, this study is largely exploratory. As a result, we test multiple

outcomes, which increases the likelihood of Type I errors in our results. Given the number of hypotheses we are testing in our main analyses, we would expect to have two false positive results at the 90% confidence level; we observe six significant effects, giving us some confidence that our results are not simply statistical noise.[15] Additionally, we are currently collecting data from a second cohort of students and will follow both cohorts throughout high school to collect a variety of outcome measures. By seeing whether our results are replicated across cohorts and whether our results are consistent over time, we will be able to feel more confident that we are estimating the true impact of the program.

Second, our analysis is likely underpowered. We have survey information from less than 650 students. Taking into account our block randomized design and observed R-squared values, our minimum detectable effect size is about 0.2 standard deviations, which is larger than the size of the effects we are currently estimating. Adding a second cohort of participants in future iterations of our analysis will increase our sample and power.[16]

Third, we find that the visits increased student conscientiousness, as proxied by item non-response rates, but had no impact on self-reported measures of seemingly related non-cognitive skills like grit. Given the experiences students had on their visits and the extent to which the various presenters and students with whom they interacted stressed the importance of diligence, responsibility, and time management, we believe it is possible that this intervention affected student academic diligence in ways potentially not well captured by self-reported grit. The eight-item grit scale we use, while validated as a measure of grit, is not necessarily well-suited to detect changes over time within an individual (Duckworth & Yeager, 2015), which could explain

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[15] We do not use a formal Benjamini-Hochberg or Bonferroni adjustment in this analysis because, given our sample size, our analysis is currently underpowered and such an adjustment would further increase the likelihood of a Type II error in our analysis.

[16] A second cohort of students participated in this project in the 2018-19 school year.

why we see no impact of the intervention on grit. It could also be that students who receive the most exciting benefit of the project (the field trips) feel grateful to the research team (whom they had seen on each visit and who administered the baseline and end-of-year survey) and feel compelled to answer all items on the survey, rather than that they actually become more conscientious. In future work, as we collect more information on students, including attendance, course grades, and eventual college enrollment, we will be able to better assess whether the field trips increased student academic diligence and conscientiousness or simply altered students' behavior on the spring survey.

Finally, we see no immediate substantial impact of the intervention on students' postsecondary plans. We find a small decrease in students' likelihood of intending to attend technical school after high school, but no change in students' intentions of attending a two or four-year university, entering the military or working. Following students longitudinally to observe students' behavior after high school will allow us to examine whether our intervention had an effect on students' postsecondary decisions despite not being able to capture an effect on students' postsecondary intentions through our survey. Additionally, all students in our study volunteer to participate in a project that offered them a chance to visit a four-year university campus three times. Over half of our sample (56.6% of students) aspire to attend a four-year university at baseline, potentially limiting our ability to detect a shift in college aspirations.

In order to close opportunity gaps in postsecondary enrollment and degree completion, researchers should find scalable interventions that can be implemented with fidelity across a variety of contexts. In this study, we explore the ability of a relatively low-cost intervention— three field trips to a local public university—to impact students' attitudes and behaviors towards college. Both school districts interested in promoting college access for their students and

universities interested in increasing their socioeconomic diversity or student population overall could easily adopt the approach we model in this intervention. While we cannot draw any strong conclusions from these preliminary findings given our limited sample size, our results suggest that such an intervention could have a meaningful impact on students' educational trajectories and improve equity in postsecondary access.

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Tables

Table 1: Reliability of Scales (Spring Survey)

Construct	Number of Items	Sample Item	Alpha
College Efficacy	14	"I can choose the high school classes needed to get into a good college."	0.9127
Grit	8	"I finish whatever I begin"	0.6204
Self-Management	10	"During the past 30 days, how often did you keep your temper in check?"	0.8572
Perspective Taking	7	"I believe that there are two sides to every question and try to look at them both."	0.7340
Academic Engagement 1	5	"I feel proud being a part of this school."	0.6993
Academic Engagement 2	3[17]	"In a typical 7 day week during the school year, about how much time do you do the following outside of school?—Completing homework for class."	0.5661

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[17] Our survey included four items, but we excluded one item ("What are your current grades?") to increase the construct's internal reliability.

Table 2: Within-School Baseline Balance

	N	Mean^	Standard Deviation^	Min	Max	"Effect" of Treatment^^	P-Value
Student Demographics							
Female	762	0.585	0.493	0	1	0.004	0.914
White	767	0.584	0.493	0	1	-0.005	0.875
Black	767	0.022	0.147	0	1	0.008	0.435
Latino/a	767	0.261	0.439	0	1	-0.016	0.580
Other	767	0.133	0.340	0	1	0.013	0.583
SES	612	0.000	1.000	-3.354	2.180	0.057	0.463
College-Going Behaviors/Intentions							
TRiO Participation	764	0.205	0.404	0	1	0.019	0.498
Prior Exposure to a College Campus	770	0.558	0.497	0	1	-0.019	0.601
Plans to Enter 4-Year College after HS	769	0.640	0.480	0	1	0.040	0.232
Talked about College w/ School Staff	772	0.570	0.455	0	2	0.036	0.271
Talked about College w/ Parents	772	1.904	0.824	0	3	0.089	0.132
Current Grades (1=Fs; 5=As)	765	4.603	0.615	1	5	0.005	0.902
College Knowledge							
College Knowledge	693	0.541	0.186	0	1	-0.013	0.337
Non-Cognitive Skills							
College Efficacy	774	2.965	0.544	1	4	0.081	0.036**
Grit	769	3.137	0.478	1	5	0.013	0.701
Self-Management	763	4.159	0.557	1	5	0.024	0.544
Perspective-Taking	759	3.395	0.696	1	5	0.052	0.299
Academic Engagement	774	2.072	0.686	1	5	0.007	0.882

*$p<0.1$, **$p<0.05$, ***$p<0.01$

^*Mean and standard deviation calculated across schools*

^^*Each baseline variable regressed on treatment status and school indicators to test for baseline balance*

Table 3: Summary Statistics of Outcome Variables from Spring Survey

	N	Mean	Standard Deviation	Min	Max
Non-Cognitive Skills					
Careless Answering (std)	646	0.000	1.000	-4.510	2.680
Item Non-Response	885	0.275	0.442	0	1
College Efficacy	646	2.959	0.592	1	4
Grit	641	3.218	0.519	1	5
Self-Management	641	4.073	0.646	1.444	5
Perspective-Taking	642	3.355	0.691	1	5
Academic Engagement 1 (Proud of school, school is boring)	643	2.924	0.364	1	4
Academic Engagement 2 (Hmwk, Study, Read)	645	1.939	0.755	1	5
Postsecondary Plans					
Find a Job	631	0.090	0.287	0	1
Enter the Military	631	0.041	0.199	0	1
Attend a Technical School	631	0.021	0.142	0	1
Attend a Community College	631	0.111	0.314	0	1
Enter 4-Year College after HS	631	0.685	0.465	0	1
Pro-College Actions					
Talked about College w/ School Staff	645	0.950	0.540	0	2
Talked about College w/ Parents	643	1.956	0.836	0	3
College Knowledge					
College Knowledge	640	0.577	0.228	0	1

Table 4: Impact of Campus Visits on Survey-Based Outcomes

	Control Mean (S.D.)	Treatment Effect (Cluster-Robust S.E)	N	R-Squared
College Knowledge				
College Knowledge	0.558	0.033**	640	0.101
	(0.230)	(0.015)		
Non-Cognitive Skills				
College Efficacy	3.201	0.047	646	0.095
	(0.876)	(0.055)		
Grit	3.192	0.040	641	0.034
	(0.530)	(0.041)		
Self-Management	4.057	0.021	641	0.049
	(0.656)	(0.054)		
Perspective	3.365	-0.017	642	0.036
	(0.700)	(0.063)		
Academic Engagement 1	2.923	0.007	643	0.039
	(0.361)	(0.023)		
Academic Engagement 2	1.970	-0.061	645	0.023
	(0.766)	(0.057)		
Careless Answering (Std)	-0.048	0.066	646	0.075
	(0.996)	(0.087)		
Item Non-Response Rate^	0.325	-0.097*	885	0.136
	(0.465)	(0.047)		
College-Going Behaviors				
Conversations w/ School Staff	0.910	0.071***	645	0.117
	(0.550)	(0.019)		
Conversations w/ Parents	1.933	0.043	643	0.033
	(0.805)	(0.053)		
Postsecondary Intentions				
Find a Job	0.086	0.009	631	0.038
		(0.021)		
Enter the Military	0.021	0.039	631	0.035
		(0.023)		
Attend Technical School	0.038	-0.034***	631	0.049
		(0.011)		
Attend Community College	0.117	-0.011	631	0.015
		(0.020)		
Attend 4-Year University	0.684	0.003	631	0.053
		(0.037)		

*$p<0.1$, **$p<0.05$, ***$p<0.01$
School fixed effects included in all models
Standard errors clustered at the school level
^Students completely missing a spring survey are included in this analysis

Table 5: Impact of Campus Visits on Survey-Based Outcomes; Controlling for Baseline College Efficacy

	Control Mean (S.D.)	Treatment Effect (Cluster-Robust S.E)	N	R-Squared
College Knowledge				
College Knowledge	0.558 (0.230)	0.046** (0.018)	572	0.145
Non-Cognitive Skills				
College Efficacy	3.201 (0.876)	-0.002 (0.05)	578	0.447
Grit	3.192 (0.530)	0.022 (0.043)	573	0.057
Self-Management	4.057 (0.656)	-0.030 (0.048)	573	0.136
Perspective	3.365 (0.700)	-0.058 (0.064)	575	0.095
Academic Engagement 1	2.923 (0.361)	-0.013 (0.032)	576	0.046
Academic Engagement 2	1.970 (0.766)	-0.095 (0.061)	577	0.070
Careless Answering	-0.048 (0.996)	-0.028 (0.078)	578	0.329
Item Non-Response Rate^	0.325 (0.465)	-0.115** (0.049)	774	0.159
College-Going Behaviors				
Conversations w/ School Staff	0.910 (0.550)	0.046 (0.030)	577	0.145
Conversations w/ Parents	1.933 (0.805)	-0.020 (0.047)	575	0.143
Postsecondary Intentions				
Find a Job	0.086	0.003 (0.025)	566	0.059
Enter the Military	0.021	0.042 (0.024)	566	0.039
Attend Technical School	0.038	-0.035** (0.012)	566	0.059
Attend Community College	0.117	-0.008 (0.020)	566	0.021
Attend 4-Year University	0.684	0.005 (0.042)	566	0.096

*p<0.1, **p<0.05, ***p<0.01
School fixed effects and self-reported feelings of college efficacy at baseline included in all models
Standard errors clustered at the school level
^Students completely missing a spring survey are included in this analysis

Table 6: Impact of Campus Visits on Ninth Grade Advanced Course-Taking (Probit, Marginal Effects Presented)

	(1) Advanced Math	(2) Advanced ELA	(3) Advanced Sci/Soc. Sci	(4) Any Advanced
Assigned to Visits	**0.064***	**0.016**	**0.061***	**0.059**
	(0.036)	**(0.033)**	**(0.034)**	**(0.039)**
Observations	552	746	467	746
Assigned to Visits	**0.038**	**0.010**	**0.035**	**0.046**
	(0.035)	**(0.034)**	**(0.023)**	**(0.035)**
Baseline College Efficacy	0.094	0.122**	0.150***	0.168***
	(0.062)	(0.057)	(0.050)	(0.056)
Observations	492	653	412	653

*** p<0.01, ** p<0.05, * p<0.1*
School fixed effects included in all models
Standard errors clustered at the school level

Appendix A: Detailed Descriptions of Campus Visits

A. Visit One

The first campus visit included a college information session and campus tour. Students arrived on campus and met with Student Ambassadors from the college admissions office. The Student Ambassadors led the students around on a campus tour, highlighting traditions, history, and unique buildings. The eighth graders then participated in a workshop the College Access Initiative developed, which presented students with information about what college is, how to succeed in college, and how to prepare for college throughout middle and high school. The workshop covered study tips, the benefits of enrolling in advanced classes and participating in extracurricular activities in high school, as well as what resources, such as school counselors, are available throughout high school. The students also heard from current undergraduate students about their experiences and were able to ask questions about college life more broadly. To conclude the first visit, students had lunch in a central dining hall, where they were exposed to a variety of food options and were able to observe and interact with college students.

B. Visit Two

The second visit to campus focused on exposing students to different departments and degree paths available at the university. Students took a tour of housing options available on campus, which included seeing a model dorm room and the common areas that are standard in community-style housing halls. Following a tour of housing, the students participated in an engineering presentation. Current engineering students described various engineering subfields and their associated career paths. The engineering students then tasked the eighth graders with constructing an object to emphasize the skills of planning, problem-solving, and using scarce resources efficiently. Some groups built a tower from newspaper and masking tape that could

stand on its own, while other students created a chain from newspaper that could lift a bucket filled with water bottles. Teams won a prize if they built the tallest tower or strongest chain. Following the engineering program and lunch, students broke into smaller groups and visited another department on campus. The participating departments included English, architecture, economics, nursing, the Volunteer Action Center, astronomy, University Recreation, and theatre. Each department organized a content-specific activity for the students.

- English – Students who visited the English department participated in a creative writing workshop and wrote poetry that could be published in an annual poetry anthology written by K-12 students around the state that the department publishes.

- Architecture – Students discussed the different subfields of architecture and received a tour of the architecture building, which included student labs, a 3D printer, laser cutter, woodworking equipment, and a rooftop lounge.

- Economics – Students learned about financial stability and played games in which they were able to make various choices and learned how those choices would likely affect their long-term financial wellbeing.

- Nursing – Nursing students created stations where they could teach basic nursing procedures to students. Eighth graders learned how and where on the body to check for a pulse, how to bandage wounds, and how to preform reflex checks on patients' knees and elbows.

- The Volunteer Action Center – Students toured an on-campus food pantry and learned about various volunteer opportunities on campus.

- Physics – Faculty and undergraduate students who participate in the campus's astrophysics club taught students about the life cycle of stars and other astrological phenomena.

- University Recreation – Students went to the largest gym on campus, learned about various recreational options on campus, and played a game of basketball.

- Theatre – Students visited a set for a current university production and learned about multiple components of theater, including acting, costumes, lighting, and set design.

C. Visit Three

For students' third visit to campus, schools choose between attending a Saturday afternoon baseball game at the university or participating in an on-campus scavenger hunt during normal school hours. Students who attended the baseball game experienced a variety of fan traditions and cheered the university's team to victory. The research team provided snacks and beverages throughout the game. The research team designed the scavenger hunt to further familiarize students with campus and to help students learn some of the traditions and stories that create a campus community. In teams, students visited a variety of buildings on campus, participated in mock office hours, and completed a series of challenges (such as performing the university's cheer on the main lawn of campus). Teams uploaded pictures and videos of themselves completing the task to a private photo-sharing account so members of the research team could determine which team won. Winning teams received medals emblazoned with the university's mascot or a small trophy. After the scavenger hunt, students finished the day by eating lunch at the on-campus dining hall.

Table B.1: Impact of Campus Visits on Survey-Based Outcomes; Controlling for School and Student Demographics

	Control Mean (S.D.)	Treatment Effect (Cluster-Robust S.E)	N	R-Squared
College Knowledge				
College Knowledge	0.558	0.035**	616	0.118
	(0.230)	(0.016)		
Non-Cognitive Skills				
College Efficacy	3.201	0.040	622	0.1044
	(0.876)	(0.059)		
Grit	3.192	0.039	617	0.036
	(0.530)	(0.043)		
Self-Management	4.057	0.008	617	0.081
	(0.656)	(0.050)		
Perspective	3.365	-0.020	618	0.045
	(0.700)	(0.062)		
Academic Engagement 1	2.923	-0.000	619	0.049
	(0.361)	(0.025)		
Academic Engagement 2	1.970	-0.058	621	0.051
	(0.766)	(0.056)		
Careless Answering (Std)	-0.048	0.051	622	0.085
	(0.996)	(0.091)		
Item Non-Response Rate^	0.325	-0.100**	835	0.148
	(0.465)	(0.045)		
College-Going Behaviors				
Conversations w/ School Staff	0.910	0.081***	621	0.126
	(0.550)	(0.219)		
Conversations w/ Parents	1.933	0.032	619	0.043
	(0.805)	(0.055)		
Postsecondary Intentions				
Find a Job	0.086	0.003	608	0.056
		(0.022)		
Enter the Military	0.021	0.038	608	0.048
		(0.023)		
Attend Technical School	0.038	-0.036***	608	0.066
		(0.012)		
Attend Community College	0.117	-0.006	608	0.309
		(0.021)		
Attend 4-Year University	0.684	0.005	608	0.077
		(0.042)		

*p<0.1 , **p<0.05, ***p<0.01
School fixed effects included in all models; controls for student gender) and race included in all models
Standard errors clustered at the school level
^Students completely missing a spring survey are included in this analysis

Table B.2: Impact of Campus Visits on Survey-Based Outcomes; Controlling for School, Student Demographics, and Baseline College Efficacy

	Control Mean (S.D.)	Treatment Effect (Cluster-Robust S.E)	N	R-Squared
College Knowledge				
College Knowledge	0.558	0.045**	568	0.158
	(0.230)	(0.017)		
Non-Cognitive Skills				
College Efficacy	3.201	-0.003	574	0.448
	(0.876)	(0.049)		
Grit	3.192	0.024	569	0.063
	(0.530)	(0.043)		
Self-Management	4.057	-0.033	569	0.160
	(0.656)	(0.044)		
Perspective	3.365	-0.051	571	0.107
	(0.700)	(0.068)		
Academic Engagement 1	2.923	-0.016	572	0.053
	(0.361)	(0.033)		
Academic Engagement 2	1.970	-0.087	573	0.092
	(0.766)	(0.058)		
Careless Answering	-0.048	-0.027	574	0.334
	(0.996)	(0.076)		
Item Non-Response Rate^	0.325	-0.113**	768	0.163
	(0.465)	(0.049)		
College-Going Behaviors				
Conversations w/ School Staff	0.910	0.044	573	0.153
	(0.550)	(0.030)		
Conversations w/ Parents	1.933	-0.021	571	0.146
	(0.805)	(0.047)		
Postsecondary Intentions				
Find a Job	0.086	0.002	562	0.074
		(0.025)		
Enter the Military	0.021	0.042	562	0.051
		(0.024)		
Attend Technical School	0.038	-0.037**	562	0.147
		(0.012)		
Attend Community College	0.117	-0.002	562	0.039
		(0.021)		
Attend 4-Year University	0.684	0.004	562	0.112
		(0.041)		

*p<0.1, **p<0.05, ***p<0.01

School fixed effects and self-reported feelings of college efficacy at baseline included in all models

Standard errors clustered at the school level

^Students completely missing a spring survey are included in this analysis

Table B.3: Impact of Campus Visits on Ninth Grade Advanced Course-Taking; Controlling for Student Demographics (Probit, Marginal Effects Presented)

	(1) Advanced Math	(2) Advanced ELA	(3) Advanced Sci/Soc. Sci	(4) Any Advanced
Assigned to Visits	**0.064***	**0.012**	**0.057***	**0.055**
	(0.033)	**(0.036)**	**(0.034)**	**(0.041)**
Female	0.080***	0.061	0.018	0.093**
	(0.030)	(0.048)	(0.038)	(0.043)
White	0.194***	0.243***	0.109	0.250***
	(0.051)	(0.035)	(0.098)	(0.076)
Latino/a	0.176***	0.166***		0.203***
	(0.046)	(0.033)		(0.072)
Other Race	0.209**	0.264***	0.159	0.298***
	(0.082)	(0.051)	(0.107)	(0.108)
Observations	544	716	465	716
Assigned to Visits	**0.039**	**0.009**	**0.033**	**0.045**
	(0.032)	**(0.035)**	**(0.024)**	**(0.036)**
Baseline College Efficacy	0.085	0.114**	0.149***	0.153***
	(0.064)	(0.055)	(0.050)	(0.055)
Female	0.093***	0.046	0.011	0.091***
	(0.025)	(0.048)	(0.026)	(0.034)
White	0.175***	0.241***	0.052	0.215***
	(0.057)	(0.037)	(0.147)	(0.084)
Latino/a	0.190***	0.156***		0.169
	(0.069)	(0.036)		(0.103)
Other Race	0.217**	0.293***	0.089	0.271**
	(0.106)	(0.050)	(0.174)	(0.124)
Observations	491	649	412	649

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Standard errors clustered at the school level
School fixed effects included in all models

Appendix C: Differential Effects for First-Generation Students

Table C.1: Impact of Campus Visits on College Knowledge, by First-Generation Status

	(1) Model 1
First Gen*Assignment	**-0.057**
	(0.046)
Assignment	0.076***
	(0.022)
First Generation	-0.028
	(0.047)
Constant	0.624***
	(0.019)
Observations	543
R-squared	0.122

*** p<0.01, ** p<0.05, * p<0.1
School fixed effects not shown
Standard errors clustered at school level

Table C.2: Impact of Campus Visits on Non-Cognitive Skills, by First-Generation Status

	(1) College Efficacy	(2) Grit	(3) Self-Management	(4) Perspective	(5) Academic Engagement 1	(6) Academic Engagement 2	(7) Carelessness	(8) Item Non- response
First Gen*Assignment	**-0.238**	**0.065**	**-0.368****	**0.086**	**-0.336****	**-0.040**	**-0.216**	**0.093***
	(0.166)	**(0.161)**	**(0.135)**	**(0.198)**	**(0.126)**	**(0.166)**	**(0.166)**	**(0.048)**
Assignment	0.202*	0.059	0.214*	-0.064	0.165	-0.069	0.178*	-0.162**
	(0.113)	(0.129)	(0.102)	(0.082)	(0.096)	(0.099)	(0.097)	(0.056)
First Generation	-0.199	-0.254**	0.006	-0.085	0.041	-0.052	-0.181	0.001
	(0.126)	(0.109)	(0.074)	(0.122)	(0.092)	(0.135)	(0.112)	(0.043)
Constant	0.242***	0.100	-0.005	0.127*	0.060	0.202***	0.183**	0.132***
	(0.074)	(0.073)	(0.058)	(0.062)	(0.057)	(0.061)	(0.066)	(0.025)
Observations	549	544	544	546	547	548	549	734
R-squared	0.126	0.042	0.074	0.058	0.048	0.036	0.105	0.168

*** p<0.01, ** p<0.05, * p<0.1
School fixed effects not shown
Standard errors clustered at the school level

Table C.3: Impact of Campus Visits on College-Going Behaviors, by First-Generation Status

	(1) Conversations w/ School Personnel	(2) Conversations w/ Parents
First Gen*Assignment	-0.090	-0.089
	(0.078)	(0.124)
Assignment	0.098**	0.047
	(0.045)	(0.078)
First Generation	-0.028	-0.121*
	(0.054)	(0.067)
Constant	0.997***	2.144***
	(0.031)	(0.032)
Observations	548	546
R-squared	0.130	0.043

*** p<0.01, ** p<0.05, * p<0.1*
School fixed effects not shown
Standard errors clustered at school level

Table C.4: Impact of Campus Visits on College-Going Intentions, by First-Generation Status

	(1) Find a Job	(2) Enter Military	(3) Tech School	(4) Comm. College	(5) 4-Year Uni.
First Gen * Assignment	**0.010**	**0.004**	**-0.050****	**0.084***	**-0.092**
	(0.052)	**(0.027)**	**(0.022)**	**(0.047)**	**(0.079)**
Assignment	-0.008	0.041	0.001	-0.054*	0.057
	(0.030)	(0.028)	(0.011)	(0.027)	(0.040)
First Generation	-0.014	0.009	0.032	-0.001	-0.015
	(0.039)	(0.016)	(0.022)	(0.051)	(0.096)
Constant	0.091***	-0.012	-0.003	0.051*	0.858***
	(0.018)	(0.015)	(0.007)	(0.024)	(0.037)
Observations	537	537	537	537	537
R-squared	0.050	0.041	0.047	0.025	0.065

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
School fixed effects not shown
Standard errors clustered at school level

Table C.5: Impact of Campus Visits on 9th Grade Course-Taking Behavior, by First-Generation Status

	(1) Advance Math	(2) Advanced ELA	(3) Advanced Sci/Soc. Sci.	(4) Any Advanced
First Gen * Assignment	0.045	-0.035	-0.009	-0.016
	(0.102)	(0.038)	(0.100)	(0.071)
Assignment	0.037	0.049	0.038	0.074
	(0.062)	(0.038)	(0.081)	(0.049)
First Generation	-0.125**	-0.104**	-0.012	-0.080
	(0.059)	(0.047)	(0.070)	(0.055)
Observations	463	619	386	619

*** p<0.01, ** p<0.05, * p<0.1
School fixed effects not shown
Standard error clustered at school level

Chapter 2: Start to Finish: Examining the Impact of the El Dorado Promise Program on Postsecondary Outcomes[18]

I.   Introduction

El Dorado, Arkansas, sits just north of the Louisiana state border. Spurred by the oil and lumber industries, its population peaked in 1960, with 25,292 residents; however, the town began losing residents in 1980 and by 2005 had fewer than 20,000 residents (Population.us, 2016). While public school enrollment in Arkansas as a whole began increasing since the 1990s, El Dorado public schools enrollment began decreasing in the 1990-91 school year. In 2006, concerned about population loss, low academic achievement, and low rates of college attendance, community leaders and Murphy Oil executives established the El Dorado Promise, a universal college scholarship program modeled after the Kalamazoo Promise in Michigan.

The El Dorado Promise scholarship is a generous scholarship for which the majority of El Dorado graduates qualify. All students who are continuously enrolled in the El Dorado School District (EDSD) from 9th grade to 12th grade receive a scholarship, with students enrolled from kindergarten through 12th grade receiving the maximum scholarship amount. The maximum scholarship amount is equal to the highest annual in-state cost (for tuition and mandatory fees) at an Arkansas public university. The scholarship is renewable for up to five years, as long as students are enrolled in an accredited two or four-year college or university. Students can use Promise funds to pay for regular undergraduate coursework at both private and public institutions. Students may combine scholarship funds with other forms of financial aid, such as the Pell Grant or the Arkansas Academic Challenge Scholarship. However, the amount of the Promise scholarship, in combination with other sources of grant aid, cannot exceed a student's

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[18] This paper was coauthored with Gary Ritter

total cost of attendance[19]; students cannot receive Promise scholarship money in the form of a refund.

We address three research questions about the effect of eligibility for the Promise scholarship on student postsecondary outcomes in this paper:

1. Does eligibility for the El Dorado Promise scholarship increase students' likelihood of postsecondary enrollment?

2. Does eligibility for the Promise scholarship increase students' likelihood of earning a college degree on time? More specifically, are Promise-eligible students more likely to earn an associate's degree within three years of high school graduation or a bachelor's degree within six years of high school graduation?

3. Are there heterogeneous effects of Promise eligibility by student characteristics; in particular, is the program particularly effective for students of color[20] or for previously high or low-achieving students?

A. Overview of Promise Programs

Promise programs are place-based scholarships with three broad goals: to increase access to postsecondary education by providing partial or complete financial assistance; to build a college-going culture within the Promise community by providing parents and students with information about college; and to foster community renewal by stabilizing or growing the community population (Miller-Adams, 2015). However, Promise programs differ significantly in their designs across communities. Promise programs can be characterized by their requirements for student eligibility, the amount of the scholarship, where the scholarship can be used, and

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[19] Cost of attendance includes tuition, fees, books and supplies, room and board, transportation, and other necessary personal expenses.
[20] Students of color are students who identify as black, Latino/a, multiracial, Asian, Native American, or Hawaiian/Pacific Islander.

when the scholarship is awarded. In terms of eligibility requirements, Promise programs can be universal, merit-based, or need-based. Universal programs, like the El Dorado Promise, award scholarships based solely on whether the student has attended the school district for the appropriate amount of time. Merit-based programs require students to meet certain eligibility thresholds, such as maintaining a certain grade point average (GPA) or completing a specific number of hours of community service. Need-based programs target students from economically disadvantaged families.

Promise programs can be characterized as narrow or wide in regards to use (LeGower & Walsh, 2014). Narrow Promise programs offer a scholarship applicable at one to three postsecondary institutions. Wide Promise programs, such as the El Dorado Promise, can be used at a variety of institutions, but there is a great deal of diversity in the restrictiveness even of wide Promise programs. The El Dorado Promise scholarship can be used at any accredited two or four-year university, while other wide programs can only be used at institutions in the same state as the scholarship program or at institutions in an explicit partnership with the Promise program.

Promise programs differ from one another based on when funding is awarded. First dollar scholarships, like the El Dorado Promise, are awarded to students before they apply for other forms of financial aid or complete the Free Application For Student Aid (FAFSA). In contrast, last dollar scholarships are applied after students have applied for all other potential forms of financial aid and "fill the gap" between students' financial aid award and their actual cost of tuition and fees. As a first dollar, universal, wide program, the El Dorado Promise is generous in comparison with other Promise programs.

The focal point of any Promise program is the guaranteed college scholarship. The maximum cost of in-state tuition and fees at a public Arkansas university determines the

maximum scholarship amount in any given year for a recipient of the El Dorado Promise scholarship. In the 2017-18 school year, this amount was $9,062 per year. In this paper, we are interested in the effect of this scholarship. Our central research question is: Did the El Dorado Promise increase rates of college enrollment and completion among Promise recipients? We then examine whether the Promise had differential impacts by student race or socioeconomic background. We briefly describe the literature examining the impact of financial aid broadly, and Promise programs specifically, on postsecondary outcomes in the next section, before turning to our evaluation of the El Dorado Promise program.

II. Prior Literature: Financial Aid, Promise Programs, and Postsecondary Outcomes

In this section, we give a brief overview of the literature examining the impacts of financial aid generally, and Promise programs specifically, on postsecondary outcomes. We focus on both access to postsecondary opportunities, as captured by enrollment, and postsecondary success, as captured by degree attainment. We begin with a broad discussion of the literature on financial aid for college, and then narrow our focus to Promise programs.

A. Impacts of Financial Aid

Students have access to three types of financial aid they can use to pay the costs associated with postsecondary education: grants or scholarships, which do not need to be repaid; loans, which may be offered at no or below-market interest rates; and work-study, when a student's salary is partially paid for by the federal government and partially by their employer. The majority of research on the impact of financial aid policies has examined the impact of grants on student outcomes (Dynarski & Scott-Clayton, 2013). However, there are exceptions, with some studies explicitly examining the differences in impacts between loans and grants (e.g., DesJardins & McCall, 2010; Field, 2009).

Grant aid can be separated into two categories: need-based aid, where students qualify for financial assistance based on their (or their family's) income; and merit-based aid, where students qualify for aid based on their academic achievement or other qualifications. From their review of the literature, Dynarksi and Scott-Clayton (2013) conclude that although the majority of the research focuses on grant aid, increased financial aid from any source is generally associated with increased college access and completion; however, impacts tend to decrease as the program application process becomes more difficult to navigate.

Both need-based and merit-based grant programs have positive impacts on college enrollment. Researchers find a positive relationship between state and federally-funded need-based aid programs with both community college enrollment and public four-year university enrollment (Hicks, West, Amos, & Maheshwari, 2014; Castleman & Long, 2016). The literature on merit-based aid is more mixed, with Zhang, Hu, and Sensenig (2013) finding a positive impact of Florida's Bright Futures scholarship on enrollment in two and four-year college enrollment, but DesJardins and McCall (2014) finding no impact of the Gates Millennium Scholars Program on undergraduate or graduate enrollment. Unconditional aid, which is not based explicitly on either need or merit, was also found to increase undergraduate enrollment among historically disadvantaged students of color (Linsenmeier, Rosen, & Rouse, 2006).

Researchers have also examined the relationship between merit and need-based aid and college persistence and degree attainment. The Cal Grant program, which has both need and merit-based eligibility requirements, increases rates of bachelor's and graduate degree completion (Bettinger, Gurantz, Kawano, & Sacerdote, 2016). Need-based aid can increase semester-to-semester persistence, credits attained, and bachelor's degree completion (Goldrick-Rab, Kelchen, Harris, & Benson, 2016; Mabel, 2017; Denning, Marx, & Turner, 2018; Denning,

2018). Merit-based aid programs also increase first-year persistence, credit accumulation, and, depending on the program, associate's, bachelor's, and graduate degree completion, as well as longer-life outcomes (Castleman & Long, 2016; Zhang, Hu, & Sensenig, 2013; DesJardins & McCall, 2014; Welch, 2014; Scott-Clayton & Zafar, 2016). Merit-based aid programs also affect which institution a student attends, and when those institutions are of lower-quality students are less likely to complete a degree (Cohodes & Goodman, 2014).

Finally, the research examining whether financial aid has differential impacts based on student characteristics is also mixed. There is some evidence to suggest that students of color experience greater benefits from aid programs than do white students (Zhang, Hu, & Sensenig, 2013; DesJardins & McCall, 2014), although researchers do not consistently find this pattern (Goldrick-Rab et al., 2016; Zhang, Hu, & Sensenig, 2013). It is also unclear whether more academically prepared students experience larger benefits from aid programs, in part because there are few direct examinations of differential effects by prior achievement among students receiving aid from the same aid program. Cross-study results are difficult to interpret because of differences in program design; for example, Castleman and Long (2016) find larger effects of a merit-based program in Florida on students with relatively high senior year GPAs, while Goldrick-Rab et al. (2016) find that need-based aid in Wisconsin had larger effects on students who were less academically prepared. An area ripe for future study, therefore, is how students' prior achievement interacts with students' aid receipt to affect student outcomes.

There is evidence that financial aid can increase college enrollment and degree attainment. However, the studies described so far have focused on general financial aid programs, where the only real intervention is the provision of funds to students. In this paper, we are interested in the impacts of a Promise program, which guarantees a college scholarship to all

students who graduate from a particular school district. In contrast to other types of financial aid, Promise programs aim to affect student outcomes not just by relaxing credit constraints to make college a financial possibility, but also by improving the quality of instruction students receive during their K-12 education as teachers and administrators raise expectations for all students and by building a college-going culture within the Promise community. Figure 1 details these potential mechanisms. We examine the impact of the El Dorado Promise on students generally and on the same subgroups (students of color, students with below average achievement, students with above average achievement) as have been examined in the financial aid literature to compare the impacts of Promise programs to more general financial aid programs. We thus contribute to a larger, and still unsettled, discussion of the extent to which financial aid affects students' postsecondary matriculation and completion, and whether these effects vary by student demographics.

Due to the multiple channels through which a Promise can alter student outcomes, we expect a Promise program would have larger impacts on college enrollment and completion outcomes than more general forms of financial aid. The next section details the prior research specifically examining the impact of Promise programs on postsecondary outcomes.

B. Postsecondary Impacts of Promise Programs

As described above, Promise programs vary based on which students are eligible for a scholarship, whether the scholarship is awarded before or after students apply for other forms of financial aid, and the number of postsecondary institutions at which a student can use their scholarship. Researchers have analyzed how Promise programs with varying designs affect students' postsecondary outcomes.

A universal, narrow, last-dollar Promise program in Tennessee increases high school graduation, community college enrollment, college credits earned in two years, and decreases four-year university enrollment (Carruthers & Fox, 2016). The Kalamazoo Promise, a universal, wide, first-dollar program, increases the share of students applying to a college or university after high school, increases postsecondary enrollment, increases the number of credits students attempted while enrolled, and increases six-year degree completion rates (Bartik, Hershbein, & Lachowska, 2017; Andrews, DesJardins, & Ranchold, 2010). Merit-based Promise programs in New Haven, CT, and Pittsburgh, PA, also increase postsecondary enrollment and persistence (Gonzalez, 2014; Daugherty & Gonzalez, 2016; Gonzalez et al., 2011; Bozick, Gonzalez, & Engberg, 2015; Page, Iriti, Lowry, & Anthony, 2018).

While the literature consistently finds positive impacts of Promise programs on college enrollment, researchers have only estimated the impact of a Promise program on degree completion in Kalamazoo, MI (Bartik, Hershbein, & Lachowska, 2017). While the Kalamazoo Promise does increase degree completion, we need more studies replicating this finding in different contexts to conclude that Promise programs generally increase postsecondary degree completion. Additionally, with the exception of Carruthers and Fox's (2016) evaluation of the Knox Achieves program, all of the Promise programs researchers have examined for their impact on postsecondary outcomes are located in urban areas. Further, although the financial aid literature disaggregates the impact of different types of aid on student subgroups, few studies of Promise programs conduct similar analyses (Bartik, Hershbein, & Lachowska, 2017 and Gonzalez et al., 2011 are exceptions). Thus, there is a gap in the literature regarding the impact of Promise programs in rural areas on postsecondary outcomes, the impact of Promise programs on postsecondary degree completion, and the differential impacts of Promise programs on

student subgroups. This study and its findings represent an important contribution to the nascent but growing research base on the postsecondary impacts of community-based Promise programs.

III.   Data

This analysis relies on administrative data that the El Dorado Promise, the El Dorado School District (EDSD), and the National Student Clearinghouse (NSC) have collected. We use information on 14 graduating classes from EDSD: cohorts who graduate in 2004, 2005, or 2006 are the pre-Promise cohorts, while students who graduate between 2007 and 2017 could potentially receive the Promise scholarship. In total, we have data on 3,727 students who graduated from the EDSD (the smallest graduating cohort is 214 students in 2004; the largest cohort is 318 students in 2012). All cohorts are included in our enrollment analysis, as we have NSC data through the spring semester of 2018 (the last observed enrollment start date is May 30, 2018). However, we require three or six years of post-high school graduation data, respectively, for our analyses of associate's and bachelor's degree completion rates. For our analysis of three-year associate degree completion, we include students who graduated between 2004 and 2015 (N=3,141). For our analysis of six-year bachelor's degree completion, we include students who graduated between 2004 and 2012 (N=2,302). For each cohort, we are able to identify students who are (or would have been) eligible for the Promise, based on when they enter the El Dorado school district. All students who transfer into the district by ninth grade are eligible for a Promise scholarship. Students who attend the district from kindergarten through 12th grade receive the full scholarship amount and students who attend the district from the ninth to 12th grades receive 65% of the maximum scholarship award. In the next section, we describe how we use this eligibility criterion to identify the impact of the Promise on postsecondary enrollment and completion. In this section, we present descriptive trends in our data.

First, we describe the students in our data. Table 1 illustrates the characteristics of students included in this study, divided into groups based on whether they graduate from the El Dorado School District before or after the announcement of the Promise program and by whether they meet the eligibility criterion of the Promise program, which is simply whether they enrolled in the EDSD before their 10th-grade year. Our total sample includes 3,727 students who graduated from EDSD between 2004 and 2017. Just over half of all students are female; this share is consistent among both Promise-eligible and Promise-ineligible students. However, a slightly larger share of eligible students are students of color than are ineligible students. Further, the share of students of color in EDSD increases from the pre-Promise period to the post-Promise period. Finally, we see that average GPA increases slightly from the pre-Promise to post-Promise period, and that eligible students tend to have higher GPAs than do ineligible students.

Next, we look descriptively at our outcomes of interest for Promise-eligible and ineligible students: postsecondary enrollment, associate degree completion, and bachelor degree completion.[21] Figure 2 presents trends in enrollment in any postsecondary institution within six months of high school graduation by students' Promise eligibility. The vertical line indicates the announcement of the Promise program in January 2007.

There are generally similar trends in postsecondary enrollment between Promise-eligible and ineligible students prior to the introduction of the Promise, with enrollment rates hovering around 60% for would-be eligible students and around 50% for would-be ineligible students between 2004 and 2006. Among the first cohort of students who could receive the Promise, 66% enroll in postsecondary education, while 43% of ineligible students enroll in a postsecondary

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[21] Descriptive trends in outcomes for all students, not disaggregated by Promise eligibility, are available in Appendix A.

institution. Enrollment rates decrease for both groups between 2007 and 2009, with enrollment rates among eligible students generally increasing after 2009, but rates remain volatile among ineligible students. In our last observed cohort, 67% of eligible students enroll in a postsecondary institution, while 33% of ineligible students enroll in a postsecondary institution within six months of graduation.

Figure 3 disaggregates postsecondary enrollment trends by student race. When we split our data by student race and Promise eligibility, we limit the number of observations in each cell, which can lead to volatility in the descriptive trends of enrollment rates over time. Despite this, we see in Figure 3 that postsecondary enrollment rates for Promise-eligible students of color decline between 2004 and 2005, in the pre-Promise period, and generally increase between 2009 and 2017, in the post-Promise period. Similarly, enrollment rates for ineligible students of color decrease between 2004 and 2006, and generally increase from 2009 to 2012, but fall in the following five years. For white students, we see in the pre-Promise period that enrollment rates decrease between 2004 and 2006 for Promise-eligible students. Following 2009, enrollment rates for eligible white students trend up, ending in 2017 at about 75%. Enrollment trends are volatile for ineligible white students throughout the period of analysis, largely due to the small cell sizes; for example, there are fewer than ten ineligible white students in the 2017 cohort.

In Figure 4 we present trends in enrollment by prior achievement, as measured by high school GPA. Postsecondary enrollment is relatively flat, around 80 percent, for students with above-average GPAs who would have been eligible for the Promise scholarship from 2004 to 2006, while postsecondary enrollment for would-be eligible students with below-average GPAs declines during that time. After the announcement of the Promise program, enrollment increases, albeit inconsistently, for eligible students with below-average GPAs, but remains relatively flat,

although again not consistently, for eligible students with above-average GPAs. For the last observed cohort, graduating in 2017, 80% of eligible students with above-average GPAs enroll in a postsecondary institution, as do 52% of eligible students with below-average GPAs. The trends for ineligible students are more volatile, in part because of small cell sizes. Ineligible students with above-average GPAs tend to enroll at higher rates than do ineligible students with below-average GPAs, except in the 2009 and 2016 cohorts.

Table 2 summarizes the pre and post-Promise average rates of enrollment overall, by race, and by GPA. For all subgroups, the simple difference-in-differences estimate (without accounting for student characteristics or changes in enrollment and completion over time) for the effect of the Promise on postsecondary enrollment (shown in the far right column) is positive. The simple difference-in-differences estimate indicates white students may benefit more from the Promise scholarship than students of color, and that students with below-average GPAs may experience a greater increase in enrollment than do students with above-average GPAs. However, we should not draw any conclusions from these descriptive statistics, as there are likely differences between Promise-eligible and ineligible students that affect postsecondary outcomes beyond Promise eligibility. For instance, Promise-ineligible students are, by definition, more mobile than Promise-eligible students. Students frequently moving between schools may be less academically prepared for college than their more stable counterparts due to inconsistencies in the curriculum they experience. If we do not account for this lower level of initial achievement by controlling for high school GPA, we will inappropriately conflate our estimate of the effect of the Promise program with the effect of lower academic preparedness on postsecondary outcomes. Thus, we prefer a multivariate approach that accounts for observable student characteristics, including high school GPA and race, which past work indicates are

correlated with postsecondary outcomes and which may also be correlated with Promise eligibility.

We turn now to the descriptive trends in bachelor's and associate's degree completion, first overall and then by race and prior achievement (measured by cumulative high school GPA). Figure 5 presents trends in associate's degree attainment for cohorts graduating between 2004 and 2014, divided into whether the students are (or would have been) eligible for the Promise. Only a small share of any students graduating from El Dorado High School earn an associate's degree within three years of graduation. The share of Promise-eligible and ineligible students earning an associate's degree hovers around 10% for all years examined. Due to the small share of students earning an associate's degree overall and for the sake of brevity, we do not present trends over time in associate's degree attainment disaggregated by student race and GPA in addition to Promise eligibility.

Table 4 summarizes the share of students earning an associate's degree overall and by race and GPA in the pre and post- Promise periods. Overall, the El Dorado Promise is associated with a three-percentage-point faster rate of growth in associate's degree attainment among Promise scholarship eligible students than among ineligible students. However, there is variation by student characteristics. The simple difference-in-differences estimates for white students and students with below-average GPAs are greater than are those for students of color and students with above-average GPAs, respectively. Among students with above-average GPAs, the rate of increase in associate's degree attainment is five percentage points greater for ineligible students than eligible students, which could indicate that the Promise program induces above-average eligible students out of associate's programs and into bachelor's programs.

Figure 6 presents the share of students earning a bachelor's degree within six years of high school graduation by Promise eligibility. Overall bachelor's degree attainment rates are relatively flat for Promise-eligible students, hovering around 25% during this time. For ineligible students, rates of attainment are more volatile, but in the post-Promise period generally, less than 10% of Promise ineligible students earn a bachelor's degree within six years of graduating high school.

Figure 7 disaggregates rates of bachelor's degree attainment rates by race. Rates of attainment are particularly volatile for would-be ineligible white students in the pre-Promise period, while attainment rates for eligible students of color and white students are more stable. Attainment rates tend to be higher for eligible students than ineligible students for all cohorts.

Figure 8 illustrates these trends in bachelor's degree completion rates based on students' cumulative high school GPA. Students with higher GPAs earn a bachelor's degree within six years of graduating from high school at a higher rate than students with lower GPAs. However, there is still evidence of volatility in the trends, particularly for ineligible students.

Table 5 summarizes the pre and post- Promise bachelor's degree attainment rates overall, by race, and by GPA. Although overall the rate of bachelor's degree completion among Promise scholarship eligible students has a more positive rate of change than the rate of change among ineligible students, there is significant variation by student characteristics. Eligible white students and students with above-average GPAs experience the greatest gains in bachelor's degree attainment relative to ineligible students of color and students with below average GPAs, respectively. However, it is clear that overall and for all groups except ineligible students of color, rates of bachelor's degree attainment decline over time.

IV. Analytic Strategy

To examine the impact of the El Dorado Promise on student higher education outcomes, we conduct a straightforward difference-in-differences analysis. We exploit the low eligibility threshold for students to receive any funding from the El Dorado Promise; namely, that students must enroll in the district for at least ninth through 12th grades in order to receive a Promise scholarship. Our basic model is:

$$(1)\ Y_i = \beta_0 + \beta_1 promiseelig_i + \beta_2 postpromise + \delta elig * post + \boldsymbol{\gamma X_i} + \tau cohort_i + \varepsilon_i,$$

where Y_i represents, in turn, each of our outcome variables: entering any postsecondary institution within six months, earning an associate's degree within three years, and earning a bachelor's degree within six years. $promiseelig_i$ captures whether student i was eligible to receive a Promise scholarship, $postpromise$ indicates whether the Promise program was in effect, $\boldsymbol{X_i}$ is a vector of student level demographic characteristics (high school GPA, gender, and race), and τ captures time trends specific to each graduating cohort. Our coefficient of interest is δ, the coefficient on the interaction between eligibility for the Promise scholarship and the Promise time period, which captures the impact of the Promise program on student outcomes. We use a Probit model for all our analyses.[22] For our subgroup analyses, we interact the main difference-in-differences parameter (δ) with an indicator for, first, student race and, second, above or below- average GPA. We calculate standard errors robust to heteroscedasticity.

A key assumption of a difference-in-differences analysis is that there are parallel pre-trends between our two groups. As demonstrated in the figures in the previous section, the trends in enrollment, associate's degree completion, and bachelor's degree completion are volatile in

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[22] We also check our results using a linear probability model; however, 389 of 3,727 predictions (10.4%) fall outside the 0-1 range when using an LPM. Thus, we only report results from the Probit.

the pre-Promise period, particularly for would-be Promise ineligible students. This volatility is most likely due to the low number of students who enter the district after their ninth-grade year (and are, therefore, Promise ineligible) and suggests that readers should interpret our results with caution. However, this analytic strategy is the standard in the limited research examining the impact of Promise programs on postsecondary outcomes, particularly for universal programs like the El Dorado Promise that do not have a minimum GPA or other eligibility criteria that could be used in a regression discontinuity design. Thus, while the cautious reader may be justified in interpreting our results as descriptive, our difference-in-differences approach is the best strategy for estimating the impact of the El Dorado Promise program on postsecondary outcomes.

V.   Results

In our main model, we control for a student's high school cumulative GPA, since it captures both observed and unobserved student characteristics that plausibly predict a student's likelihood of enrolling in and graduating from a postsecondary institution (Armstrong & Carty, 2003; Adelman, 2006; Bowen, Chingos, & McPherson, 2009; Mattern & Wyatt, 2012; Easton, Johnson, & Sartain, 2017). Past work (Ash, 2015) has demonstrated that the El Dorado Promise led to an increase in scores on state standardized assessments. Students could be incentivized by the Promise to achieve at higher levels, as measured by test scores, and this increase in achievement could lead to increased GPAs. Additionally, an unintended consequence of the guaranteed scholarship could have been an incentive for teachers to relax their grading standards to improve students' chances of being accepted to college, leading to grade inflation and increased student GPAs. Empirically, we see that average GPAs does increase over time: the average cumulative GPA for a student graduating before the Promise is 2.72, while the average cumulative GPA for a student graduating in the post-Promise period is 2.78; the difference in

average GPA in the pre and post-Promise periods is statistically significant at the 95% confidence level.

While the average cumulative GPA of EDSD graduates increases over time, it is not clear that there is rapid grade inflation (or deflation) following the announcement of the Promise program. The lack of a striking change in GPA in the pre and post-Promise periods might indicate that we can include cumulative GPA in our model estimating the impact of the Promise scholarship on college enrollment, associate's degree completion, and bachelor's degree completion. However, it is possible that the Promise affected GPA directly, and controlling for GPA implicitly controls for some of the Promise "treatment." We believe that high school GPA is an important measure of both student academic ability and non-cognitive skills related to college matriculation and success, such as completing college applications on time, attending class, and visiting professors' office hours. Thus, in the models presented below, we control for cumulative high school GPA. We present alternative specifications in Appendix B that do not control for GPA; all estimates point in the same direction and are of a roughly similar magnitude.

Table 6 presents the results from the difference-in-difference Probit overall and by subgroups. Overall, the Promise is associated with a 14.0 percentage point increase in postsecondary enrollment, which is both statistically significant and practically large. The estimated coefficients on the covariates also point in the expected directions. As high school GPA increases, so too does a student's likelihood of enrolling in a postsecondary institution. Female students are about four percentage points more likely to enroll in a postsecondary institution than are male students.

We next estimate the impacts of the Promise separately for students of color and white students. The Promise is associated with an estimated 15.0 percentage point increase in

postsecondary enrollment for students of color, and a 12.7 percentage point increase in postsecondary enrollment for white students. In separate analyses, we test whether each of these effects is significantly different from the overall effect. We find that the effect for students of color is not significantly different from the overall effect, while the effect for white students is significantly lower than the overall effect. Controlling for GPA, the overall impact of the Promise program on enrollment is largely driven by students of color.[23] Again, the estimated coefficients on the covariates in the model point in the expected direction.

Finally, we estimate the impact of the Promise program separately for students whose GPA is average or above average for their cohort and students whose GPA is below average for their cohort. While students with average or above-average GPAs are 24.4 percentage points more likely to enroll in postsecondary education than are students with below-average GPAs, all else equal, the Promise program seems to encourage students with all levels of high school achievement to attend college. Specifically, we estimate that Promise-eligible students with below-average GPAs are 15.5 percentage points more likely to attend college than Promise-ineligible students with below-average GPAs. Students with above-average GPAs are 10.8 percentage points more likely to enroll at a postsecondary institution. Post hoc tests indicate that the impact of the Promise on students based on their prior GPA is not significantly different, suggesting any positive effects of the Promise on postsecondary enrollment are experienced by students across the distribution of high school achievement.

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[23] This result differs from the descriptive difference-in-differences estimate, which suggests that white students experience a larger increase in enrollment after the introduction of the Promise. This difference is largely because we control for high school GPA; in both the pre and post-Promise period, white students have a higher average GPA than do students of color. When we do not control for high school GPA, the effects for students of color and white students are not significantly different from each other.

Although the El Dorado Promise can be used at any postsecondary institution in the country, it could induce students to stay in state for college because it is pegged to the highest cost of tuition and fees for an in-state university. We examine whether eligible students are more likely to attend an in-state institution following the introduction of the Promise program. Descriptive trends and results from our difference-in-differences regression analyses are presented in Figure C.1 and Table C.1, respectively, in Appendix C. We find that overall the Promise is not associated with a shift towards in-state institutions, although Promise-eligible students with below-average GPAs are 10.7 percentage points more likely than Promise-ineligible students with below-average GPAs to attend an in-state institution following the introduction of the program.

There is no impact of the Promise program on associate's degree completion within three years of high school graduation, either overall or for subgroups of students, as shown in Table 7. The overall impact is a nominal 3.6 percentage point increase in associate's degree completion within three years of high school graduation, but the estimate is imprecise. Similarly, the estimates for students of color, white students, students with above-average GPAs and students with below-average GPAs are nominally positive but imprecise, and not statistically significant at conventional levels.

We turn now to the estimated impacts of the Promise program on bachelor's degree completion within six years of high school graduation, presented in Table 8. On average, the Promise program is associated with an 8.8 percentage point increase in bachelor's degree attainment within six years of high school graduation. This effect is statistically significant at the 90 percent confidence level. We next examine the impact of the Promise program by student race. The Promise program is associated with an 8.8 percentage point increase in bachelor's

degree attainment among eligible students of color relative to ineligible students, and an 8.8 percentage point increase in bachelor's degree attainment among white students. Only the effect for white students is statistically significant, but neither the effect of the Promise scholarship on students of color nor the effect of the program on white students can be statistically distinguished from the overall effect. Finally, we examine the relationship between Promise eligibility and bachelor's degree completion among students with above and below- average GPAs. Students with above-average GPAs appear to benefit the most from the Promise, experiencing an increase in bachelor's degree attainment of 11.1 percentage points relative to ineligible students with above-average GPAs. This effect is statistically significant at the 95 percent confidence level. There is no statistically significant impact of the Promise program on students with below-average GPAs in terms of bachelor's degree attainment within six years of high school graduation. Post hoc tests indicate the estimated effect of the Promise on students with below-average GPAs is significantly less than the overall impact of the Promise, while the impact of the Promise on students with above-average GPAs is not statistically different from the overall impact of the Promise. Taken together, these findings suggest that students with above-average achievement drive the overall impact of the Promise program on bachelor's degree completion.

We find that the Promise is associated with an increase in bachelor's degree completion rates, but no change in associate's degree completion rates. This might raise the question of whether the Promise induced more students to enroll in four-year universities and fewer students to enroll in two-year colleges. We look at this descriptively in our difference-in-differences regression framework in Figures C.2-C.7 and Table C.2 in Appendix C. We find that the Promise program is associated with an increase in the likelihood of enrollment in four-year universities overall (10.3 percentage points) and for all student subgroups except students with below-

average GPAs. The Promise program is associated with an increased likelihood that eligible students with below-average GPAs will enroll in a two-year college (11.2 percentage points), but otherwise does not increase the likelihood of enrollment at a two-year college for students overall or other subgroups examined. This suggests that the El Dorado Promise induces students who would not otherwise have enrolled in college to attend a four-year university, or, for more marginal students, a two-year college, but that the Promise does not shift already college-bound students from two-year to four-year institutions.

A. Robustness Checks

Because the small number of ineligible students in any given cohort makes our enrollment and completion trends volatile, it is difficult to verify the parallel trends assumption for a difference-in-differences analysis in our data by a simple visual inspection of the graphs. We therefore conduct a placebo test as an additional check of this assumption. We regress each of three demographic variables (gender, race, and high school GPA) that should be unrelated to the introduction of the Promise on an indicator for the post-Promise period, Promise eligibility, and an interaction between the post-Promise period and Promise eligibility. If the difference-in-differences estimate for each demographic characteristic is insignificant, it will give us greater confidence that our findings are not the result of changes in student composition in the EDSD during this time and that our main estimate of the effect of the Promise on student outcomes is unbiased. These results are presented in Appendix D. There is no statistically significant impact of the Promise program on the likelihood a student is female, the likelihood a student is a student of color, or on students' high school GPA. These results give us greater confidence that our estimates give the true impact of the Promise, and are not biased by simultaneous compositional changes in the district.

In our main specification, we use the largest sample available to estimate effects for each of our outcomes of interest: postsecondary enrollment, associate's degree attainment, and bachelor's degree attainment. Specifically, when looking at enrollment effects, we use data from 14 cohorts of students (2004 through 2017); when looking at associate's degree attainment, we use data from 12 cohorts of students (2004 through 2015); and for bachelor's degree attainment, we use data from nine cohorts (2004 through 2012). In order to test the robustness of these findings, we estimate the impact of all three outcomes using a consistent sample: students graduating from the EDSD between 2004 and 2012.

Using this restricted sample, we find that the overall estimated effect of the El Dorado Promise on postsecondary enrollment is 11.9 percentage points, slightly less than the 14.0 percentage points estimate found when using our full sample. This result is statistically significant at the 95 percent confidence level. Similar to our main results, the relationship between Promise eligibility and enrollment is larger for students of color than for white students. Enrollment rates among students of color increase by 13.9 percentage points following the announcement of the Promise program, an effect that is significant at the 95 percent confidence level. We estimate the Promise program is associated with a 9.1 percentage point increase in enrollment among white students, but the effect is not statistically significant. In the restricted sample the effect of the Promise on enrollment is concentrated on students with above-average GPAs. Students with above-average GPAs are an estimated 23.3 percentage points more likely to enroll in college, an effect that is significant at the 99 percent confidence level. There is no statistically significant impact of the Promise program on enrollment for students with below-average GPAs. The effects of the Promise program on this restricted sample are smaller than the effects we estimate for the whole sample. These results indicate that the effect of the Promise

program grew over time, with students exposed to the Promise longer benefitting more from the guarantee of a scholarship. This could be because teachers and students needed time to adjust their expectations and behaviors after the announcement of the Promise to fully prepare students for college. Students in the 2013 cohort, for example, would have known about the Promise scholarship since their sixth-grade year, providing them (and their teachers) ample time to adjust their expectations and effort to prepare for college. The El Dorado Promise office has also worked continuously to provide programming for students and teachers related to college awareness and enthusiasm for the Promise; improvements in that programming could also contribute to an increasingly positive relationship between the Promise and postsecondary outcomes.

When we examine the impact of the Promise program on associate's degree attainment within the restricted sample of 2004-2012 graduates, we find statistically insignificant impacts of the Promise on average and for all subgroups, which is consistent with our findings when using all available cohorts. In short, our results are not substantially a function of our sample.

There is also a concern that, because we are conducting a difference-in-differences analysis using 14 years of data, our standard errors are biased because of serial correlation (Bertrand, Duflo, & Mullainathan, 2002). We test the robustness of our findings following the randomization inference procedures described in Bertrand, Duflo, and Mullainathan (2002). We run 500 permutations with our data, randomly assigning 3,220 students to Promise-eligible status and 507 students to Promise-ineligible status each time. We then compare the distribution of estimated difference-in-differences "effects" of being eligible for the Promise in the post-Promise period from those 500 permutations to the effect we estimate given students' actual eligibility status. Figures 9-11 show the results from these permutations for our enrollment,

associate's degree completion, and bachelor's degree completion analyses, respectively. We find that our estimated effects for postsecondary enrollment would occur by chance less than 1 percent of the time. Further, the estimated effects for six-year bachelor's degree completion given actual student eligibility would occur by chance four to five percent of the time. Finally, our estimated effects for three-year associate's degree completion would occur by chance 14 to 15 percent of the time. These results support the statistical inferences we reached in our main analyses: the Promise program significantly and positively related to postsecondary enrollment and rates of six-year bachelor's degree completion, but is unrelated to rates of three-year associate's degree completion.

VI.   Discussion and Conclusion

We find suggestive evidence that the El Dorado Promise program increases postsecondary enrollment on average and particularly for students of color and students with below-average GPAs. These effects (14.0, 15.0, and 15.5 percentage points, respectively) are statistically significant and practically large. We find no evidence that the Promise program affected associate's degree attainment within three years of students' graduation from high school, either on average or for subgroups. The Promise program does increase bachelor's degree attainment. We estimate an 8.8 percentage point increase in bachelor's degree attainment within six years of high school graduation on average among Promise-eligible students following the announcement of the scholarship. This effect is largest for students with above-average GPAs, whose bachelor's degree completion rate increased by 11.1 percentage points. These results indicate that a Promise program, which includes an increased emphasis on college readiness throughout K-12 and financial support throughout college, can improve students' postsecondary outcomes, particularly for students seemingly well-prepared for postsecondary

academics. Our results are robust to decisions about sample inclusion and randomization inference procedures and are not driven by observable compositional changes in the district.

Our results are consistent with prior findings from the Kalamazoo Promise. Bartik, Hershbein, and Lachowska (2017) find that the Kalamazoo Promise led to a 14 percent increase in postsecondary enrollment and a 10-percentage point increase in six-year bachelor's degree attainment. Our replication of the same pattern of effects in El Dorado suggests these results are not the product of sample selection or methodological choices, but rather a true effect of a Promise program on postsecondary outcomes. However, readers should still interpret our results with caution. Descriptively, overall postsecondary enrollment and completion rates declined for students graduating between 2007 and 2017. The Promise program seems to have acted as a buffer for eligible students, maintaining enrollment and completion rates or leading to slight increases, but it is clear that other factors besides the Promise program were affecting both eligible and ineligible EDSD students during the period we analyze. Future work should examine these broader trends.

Additionally, we have limited evidence that the identifying assumption of our difference-in-differences analysis is met. Our comparison group is students who are, or would be, ineligible for the Promise, meaning they transferred into the district after 9th grade. This is a small group of students, and rates of postsecondary enrollment and completion are volatile in the pre-Promise period. It is therefore difficult to determine if the eligible and ineligible students have common pre-trends, which is necessary to attach a causal interpretation to the results of a difference-in-differences analysis. However, at the least, our results descriptively indicate that a Promise program is associated with improved postsecondary outcomes. Given the dearth of research on the impacts of Promise programs in general and rural Promise programs in particular, on

postsecondary outcomes, our results make a valuable contribution to our understanding of the ability of Promise programs to impact students in the long-term. Future analyses of the impact of the El Dorado Promise on postsecondary outcomes are warranted, as sample sizes will continue to increase as more students are exposed to the Promise and the volatile trends we observe in this analysis may smooth out with additional data. The El Dorado Promise is unique in its geographic context and relatively generous scholarship, so understanding its full impacts should be of interest to policymakers and researchers alike.

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Tables and Figures
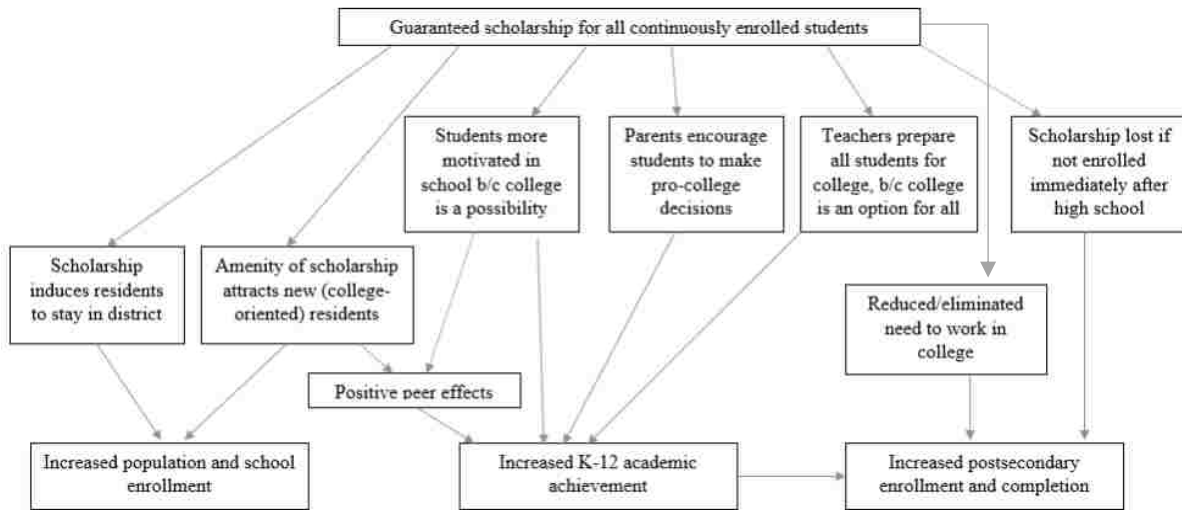
Figure 1: Theoretical Framework for Promise Programs

Table 1: Student Characteristics by Promise Period

Demographics	All El Do Graduates	All Eligible	All Ineligible	Pre-Promise All	Post-Promise All
N	3,727	3,220	507	691	3,036
Female	52.4%	52.7%	52.4%	54.8%	51.9%
Students of Color	52.7%	53.0%	51.2%	49.8%	53.4%
Black Students	48.3%	48.9%	44.0%	48.5%	48.2%
Latino/a Students	2.7%	2.5%	3.7%	1.0%	3.1%
Other Race Students	1.3%	1.1%	2.5%	0.3%	1.5%
White Students	47.3%	47.0%	48.8%	50.2%	46.6%
Mean GPA	2.77	2.79	2.61	2.72	2.78
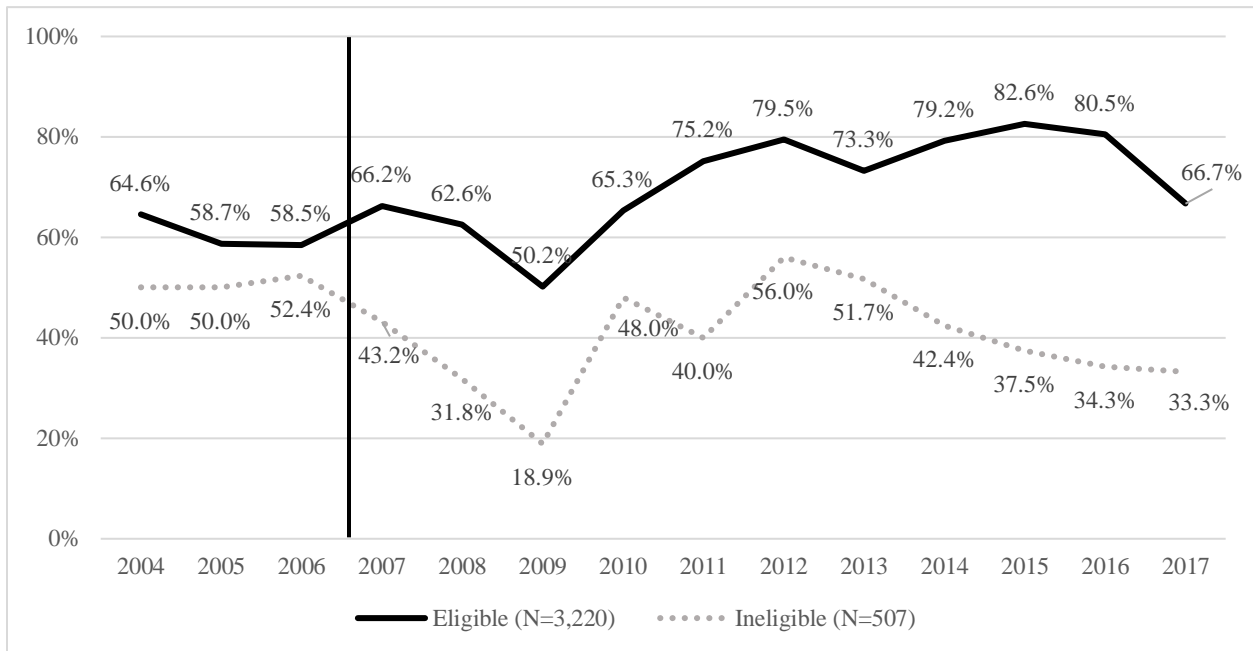
Figure 2: Percent of El Dorado Students Enrolled in ANY Postsecondary Institution within 6 Months of High School Graduation, by Promise Eligibility
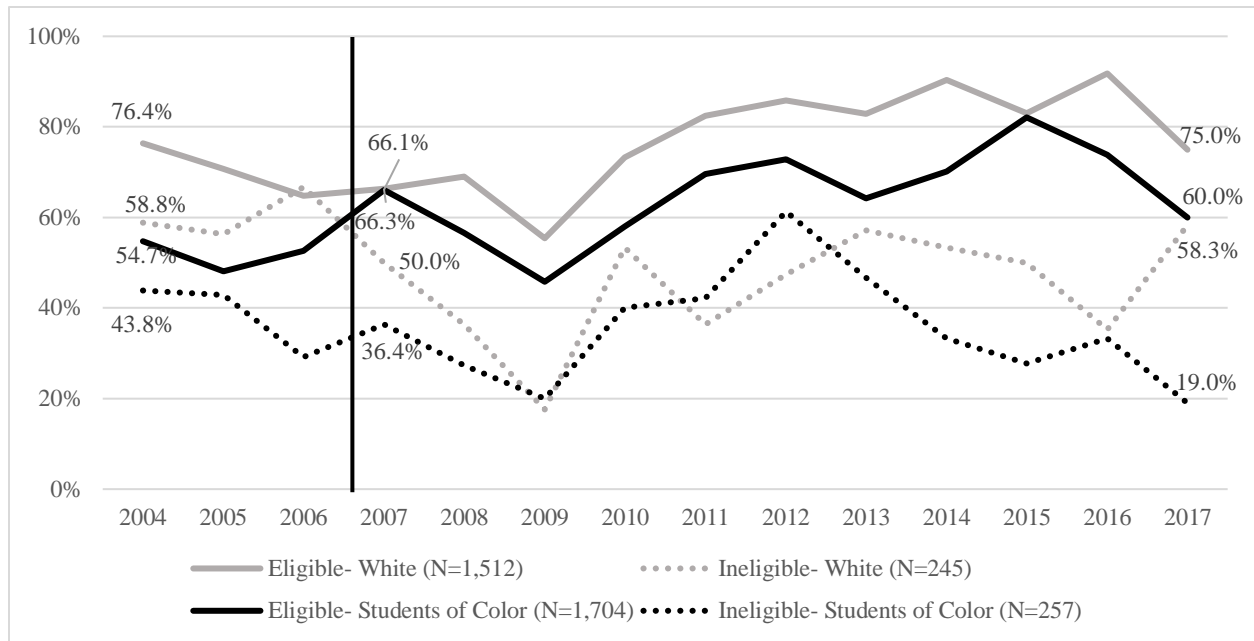
Figure 3: Percent of El Dorado Students Enrolled in ANY Postsecondary Institution within 6 Months of High School Graduation, by Eligibility and Race
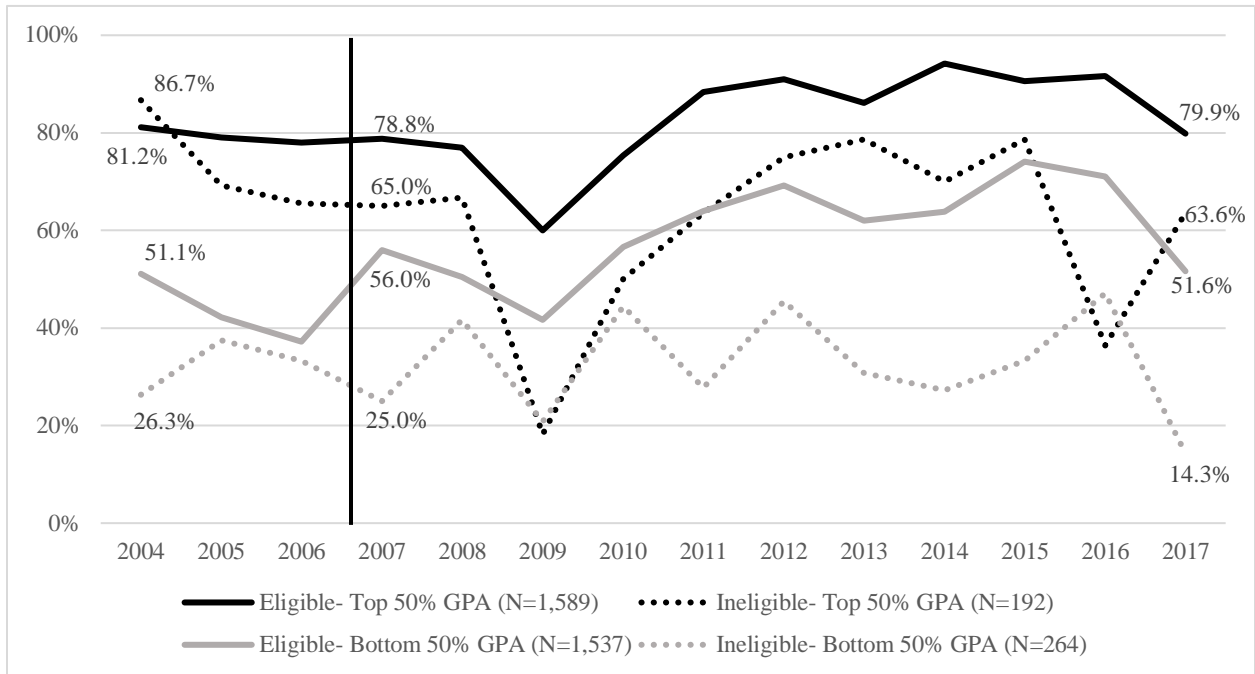
Figure 4: Percent of El Dorado Students Enrolled in ANY Postsecondary Institution within 6 Months of High School Graduation, by Eligibility and GPA

Table 2: Percent of El Dorado HS Graduates Enrolled at Any Institution within 6 months

	Pre-Promise Eligible	Pre-Promise Ineligible	Post-Promise Eligible	Post-Promise Ineligible	**Diff-in-Diff**
Overall	60.5%	51.2%	71.3%	40.2%	**21.8 ppts**
Difference		*9.3 ppts*		*31.1 ppts*	
Students of Color	51.6%	37.0%	65.4%	36.5%	**14.3 ppts**
Difference		*14.6 ppts*		*28.9 ppts*	
White students	70.6%	62.5%	78.1%	45.1%	**24.9 ppts**
Difference		*8.1 ppts*		*33.0 ppts*	
Above Average GPA	79.3%	71.9%	83.2%	63.0%	**12.8 ppts**
Difference		*7.4 ppts*		*20.2 ppts*	
Below Average GPA	43.5%	32.3%	60.5%	31.7%	**17.6 ppts**
Difference		*11.2 ppts*		*28.8 ppts*	

Figure 5: Percent of El Dorado Students Earning an AA within 3 Years of High School Graduation

Table 4: Percent of El Dorado Graduates Earning an Associate's Degree within 3 Years of High School Graduation

	Pre-Promise Eligible	Pre-Promise Ineligible	Post-Promise Eligible	Post-Promise Ineligible	**Diff-in-Diff**
Overall	4.8%	4.7%	8.4%	5.0%	**3.3 ppts**
Difference		*0.1 ppts*		*3.4 ppts*	
Students of Color	4.5%	1.9%	6.4%	3.9%	**-0.1 ppts**
Difference		*2.6 ppts*		*2.5 ppts*	
White students	5.1%	6.9%	10.6%	6.4%	**6.0 ppts**
Difference		*-1.8 ppts*		*4.2 ppts*	
Above Average GPA	7.0%	1.8%	9.1%	8.9%	**-5.0 ppts**
Difference		*5.2 ppts*		*0.2 ppts*	
Below Average GPA	2.8%	7.7%	7.1%	3.0%	**9.0 ppts**
Difference		*-4.9 ppts*		*4.1 ppts*	

Figure 6: Percent of El Dorado Students Earning a BA within 6 Years of High School Graduation
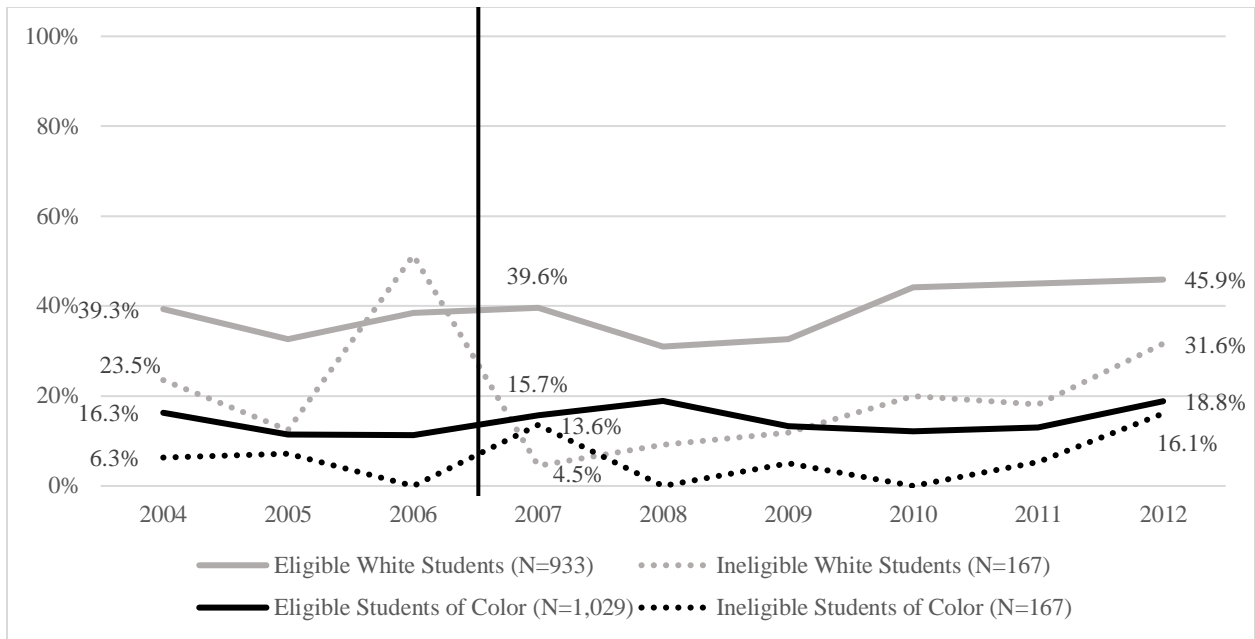
Figure 7: Percent of El Dorado Students Earning a BA within 6 Years, by Race
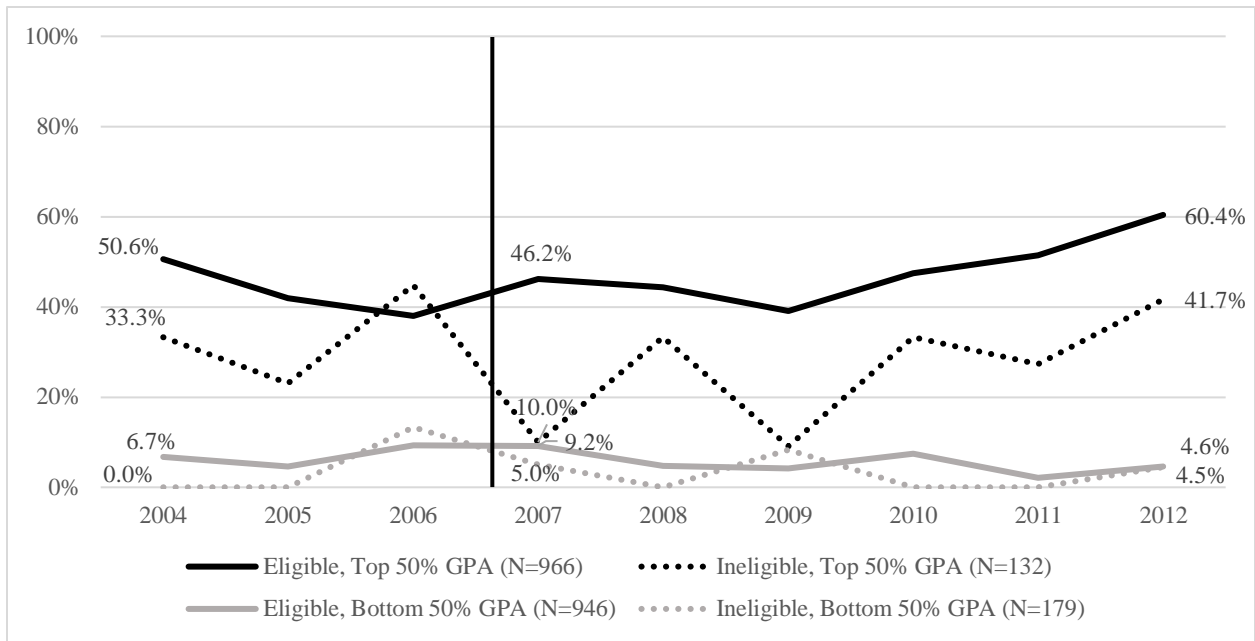
Figure 8: Percent of El Dorado Students Earning a BA within 6 Years, by GPA

Table 5: Percent of El Dorado HS Graduates Earning a BA within 6 Years of Graduation

	Pre-Promise Eligible	Pre-Promise Ineligible	Post-Promise Eligible	Post-Promise Ineligible	**Diff-in-Diff**
Overall	24.4%	21.7%	18.1%	9.3%	**6.1 ppts**
Difference		*2.7 ppts*		*8.8 ppts*	
Students of Color	12.9%	3.7%	9.5%	7.4%	**-7.1 ppts**
Difference		*9.2 ppts*		*2.1 ppts*	
White students	36.8%	36.1%	27.9%	11.6%	**15.6 ppts**
Difference		*0.7 ppts*		*16.3 ppts*	
Above Average GPA	43.2%	36.8%	32.9%	20.0%	**6.5 ppts**
Difference		*6.4 ppts*		*12.9 ppts*	
Below Average GPA	6.7%	6.2%	3.1%	2.5%	**0.1 ppts**
Difference		*0.5 ppts*		*0.6 ppts*	

Table 6: Impacts of the El Dorado Promise on Postsecondary Enrollment within 6 months of Graduation

	(1) Overall Impacts	(2) Impacts by Race	(3) Impacts by GPA
Elig*Post	**0.140***** **(0.046)**		
Elig*Post*Of Color		**0.150***** **(0.048)**	
Elig*Post*White		**0.127***** **(0.049)**	
Elig*Post*Top 50% GPA			**0.108** **(0.051)**
Elig*Post*Bottom 50% GPA			**0.155***** **(0.049)**
Promise Eligible	0.064 (0.039)	0.065* (0.039)	0.083** (0.040)
Post Promise Announcement	0.058 (0.058)	0.056 (0.058)	0.060 (0.060)
Cumulative High School GPA	0.185*** (0.010)	0.185*** (0.010)	
Top 50% GPA			0.244*** (0.026)
Female	0.041*** (0.015)	0.040*** (0.015)	0.064*** (0.015)
Student of Color	-0.011 (0.016)	-0.027 (0.026)	-0.050*** (0.016)
Observations	3,502	3,499	3,502

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Standard errors in parentheses

Note: Marginal coefficients from Probit model presented

Table 7: Impacts of the El Dorado Promise on AA Completion within 3 Years of Graduation

	(1) Overall Impacts	(2) Impacts by Race	(3) Impacts by GPA
Elig*Post	**0.036** **(0.036)**		
Elig*Post*Of Color		**0.031** **(0.038)**	
Elig*Post*White		**0.043** **(0.037)**	
Elig*Post*Top 50% GPA			**0.027** **(0.039)**
Elig*Post*Bottom 50% GPA			**0.051** **(0.036)**
Promise Eligible	-0.004 (0.031)	-0.005 (0.030)	-0.006 (0.031)
Post Promise Announcement	0.033 (0.040)	0.032 (0.039)	0.033 (0.040)
Cumulative High School GPA	0.012* (0.007)	0.012 (0.007)	
Top 50% GPA			0.044** (0.021)
Female	0.005 (0.010)	0.005 (0.010)	0.004 (0.010)
Student of Color	-0.029** (0.012)	-0.020 (0.021)	-0.027** (0.011)
Observations	3,005	3,005	3,005

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses
Note: Marginal coefficients from Probit model presented

Table 8: Impacts of the El Dorado Promise on BA Completion within 6 Years of High School

	(1) Overall Impacts	(2) Impacts by Race	(3) Impacts by GPA
Elig*Post	**0.088***		
	(0.052)		
Elig*Post*Of Color		**0.088**	
		(0.056)	
Elig*Post*White		**0.088***	
		(0.053)	
Elig*Post*Top 50% GPA			**0.111****
			(0.052)
Elig*Post*Bottom 50% GPA			**0.042**
			(0.058)
Promise Eligible	0.005	0.005	0.042
	(0.039)	(0.039)	(0.037)
Post Promise Announcement	-0.055	-0.055	-0.038
	(0.053)	(0.053)	(0.054)
Cumulative High School GPA	0.266***	0.266***	
	(0.010)	(0.010)	
Top 50% GPA			0.281***
			(0.027)
Female	-0.006	-0.006	0.025
	(0.016)	(0.016)	(0.016)
Student of Color	-0.046***	-0.046*	-0.100***
	(0.017)	(0.028)	(0.016)
Observations	2,219	2,219	2,219

*** p<0.01, ** p<0.05, * p<0.1*
Standard errors in parentheses
Note: Marginal coefficients from Probit model presented
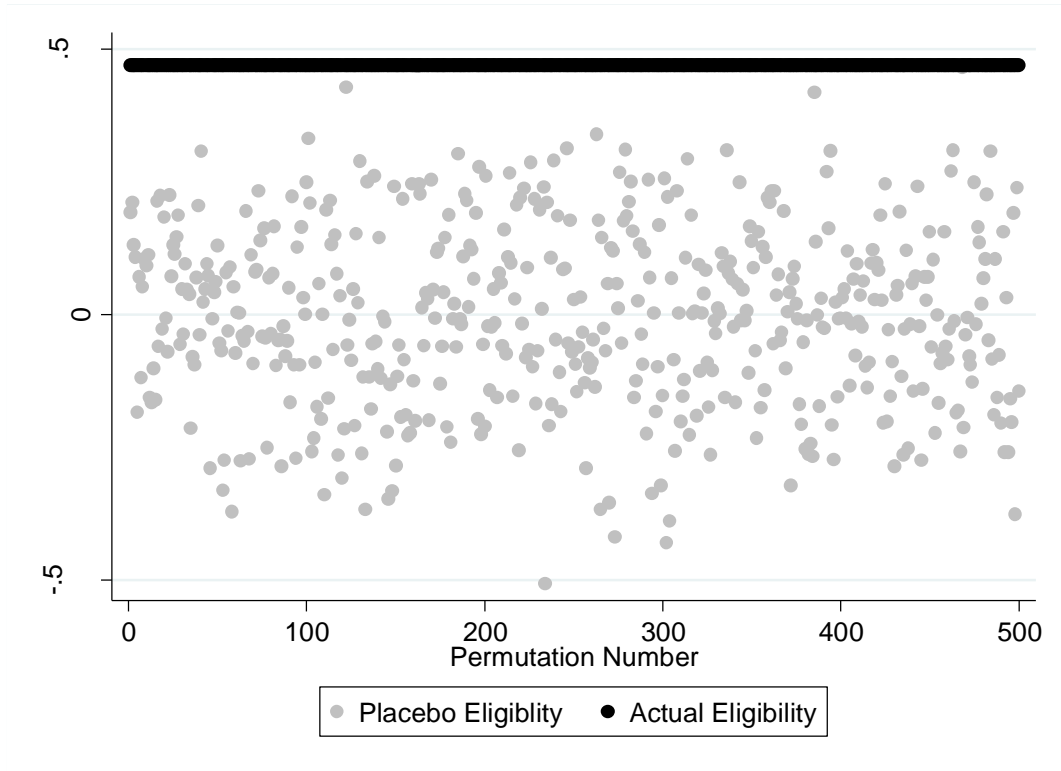
Figure 9: Randomization Inference for Postsecondary Enrollment Effects
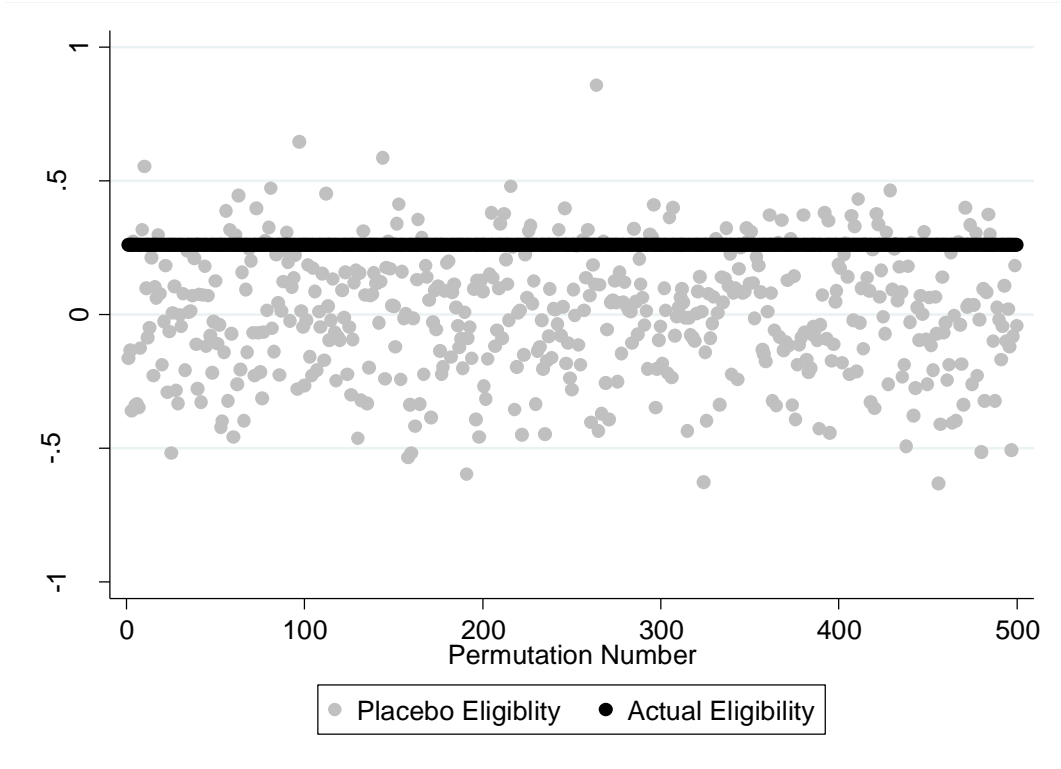
Figure 10: Randomization Inference for 3-Year AA Completion Effects
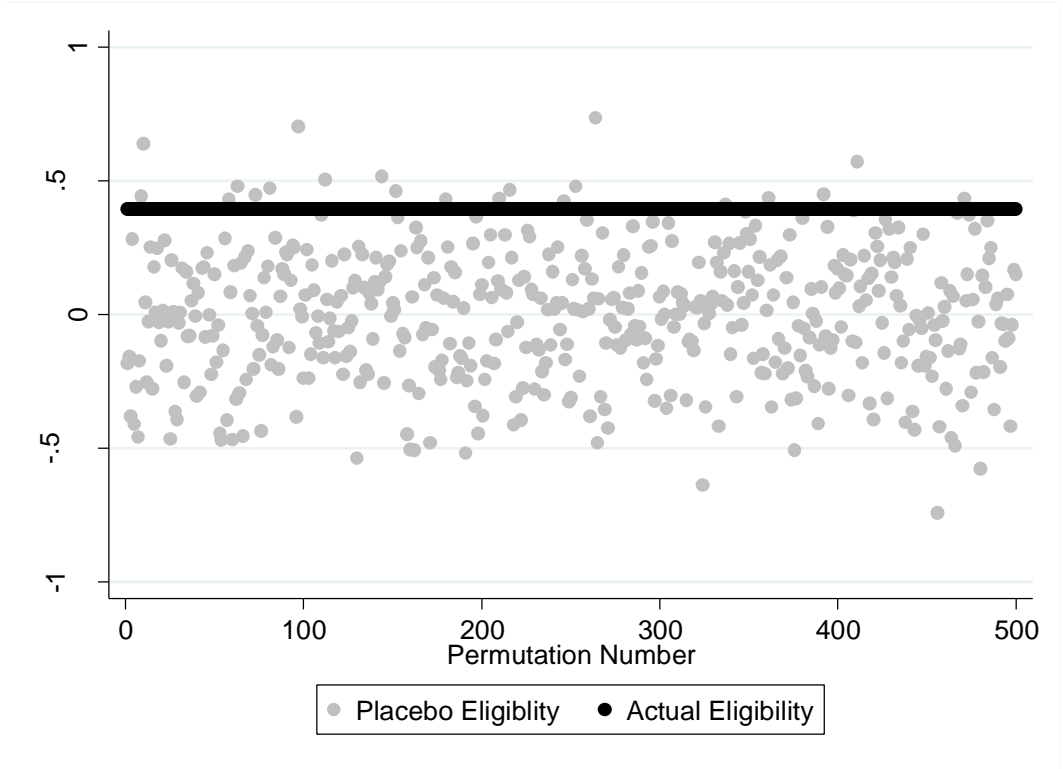
Figure 11: Randomization Inference for 6-Year BA Completion Effects

Appendix A: Descriptive Trends in Outcomes
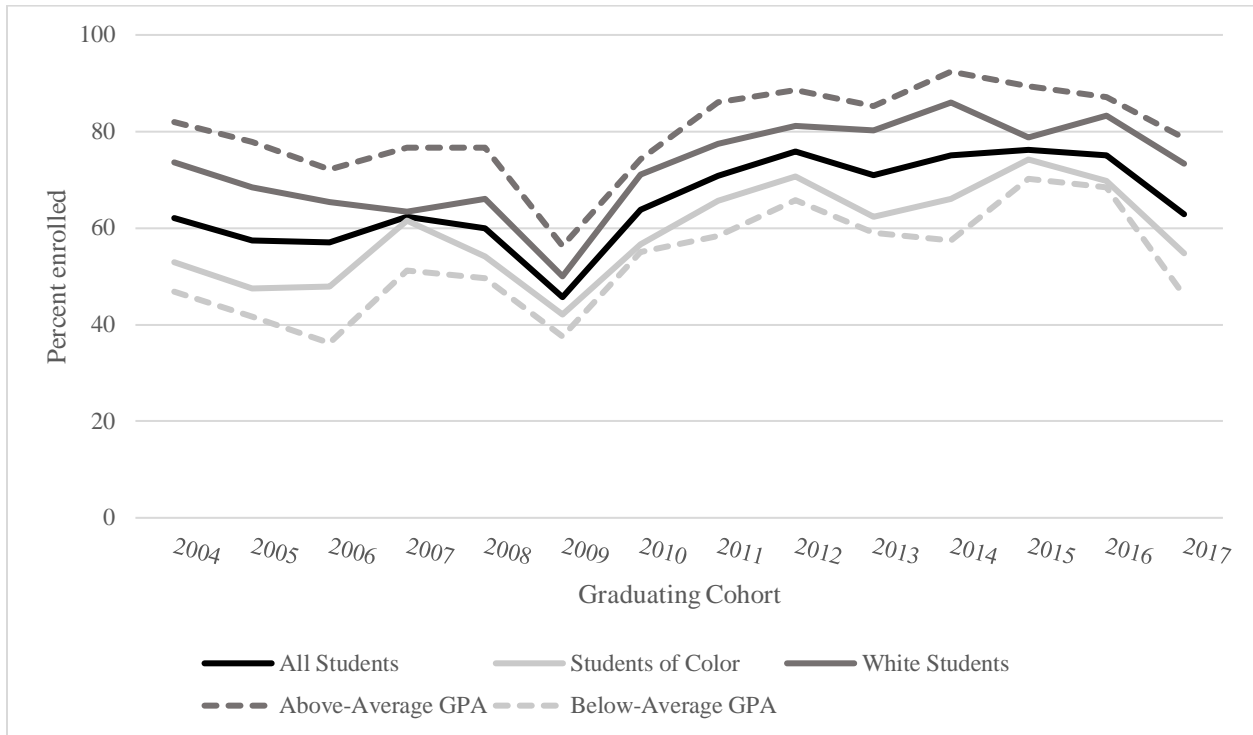
Figure A.1: Postsecondary enrollment within 6 months of high school graduation, by cohort and demographic
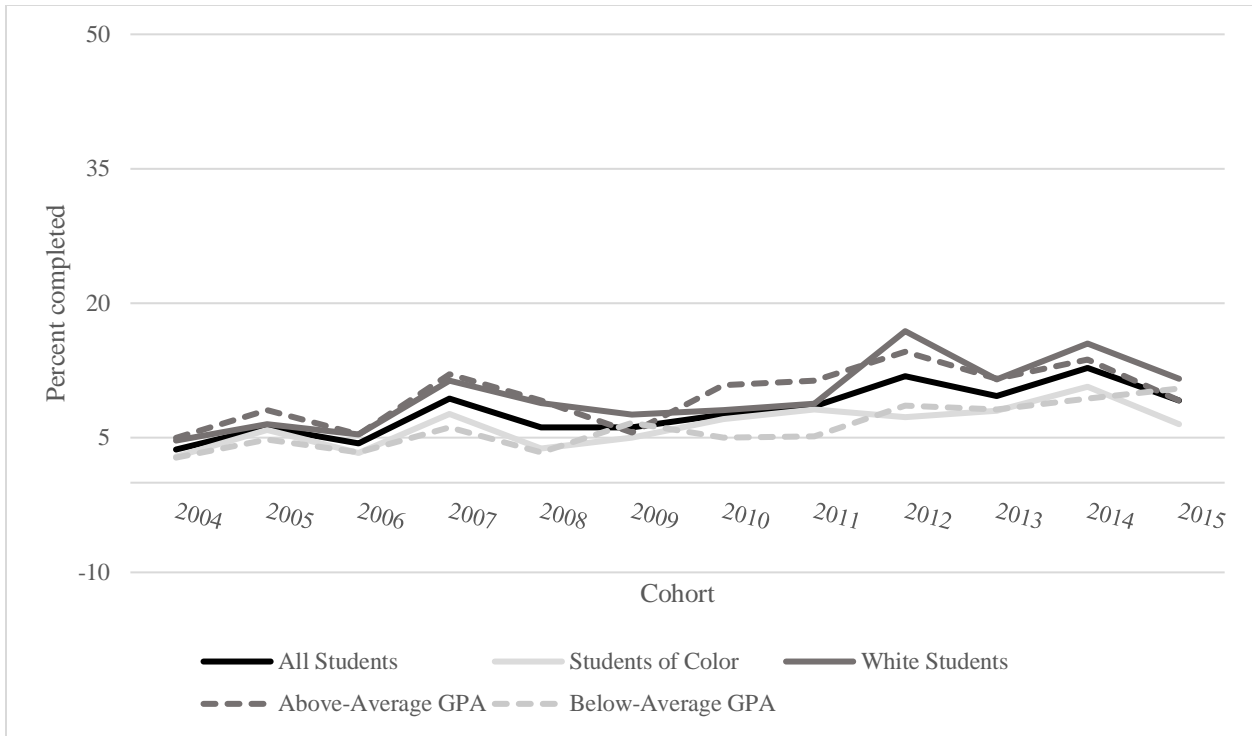
Figure A.2: Associate's degree completion within 3 years of high school graduation, by cohort and demographic
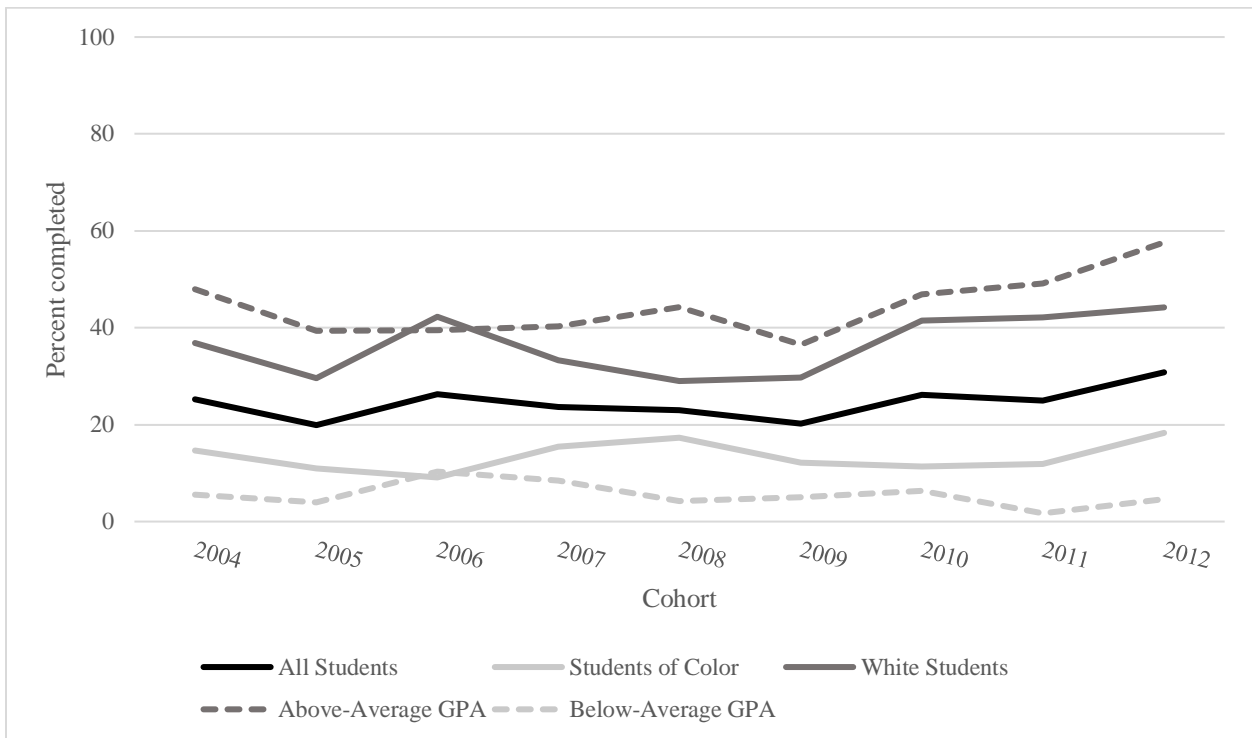
Figure A.3: Bachelor's degree completion within 6 years of high school graduation, by cohort and demographic

Appendix B: Results from Alternative Specifications

Table B1: Impact of the El Dorado Promise on Postsecondary Enrollment without Controlling for High School GPA

	(1) Overall Impacts	(2) Impacts by Race	(3) Impacts by GPA
Elig*Post	**0.184***		
	(0.047)		
Elig*Post*Of Color		**0.193***	
		(0.049)	
Elig*Post*White		**0.173***	
		(0.051)	
Elig*Post*Top 50% GPA			**0.268***
			(0.047)
Elig*Post*Bottom 50% GPA			**0.107**
			(0.047)
Promise Eligible	0.091**	0.093**	0.085**
	(0.041)	(0.041)	(0.040)
Post Promise Announcement	0.061	0.057	0.063
	(0.062)	(0.062)	(0.060)
Female	0.100***	0.099***	0.079***
	(0.014)	(0.015)	(0.015)
Student of Color	-0.131***	-0.145***	-0.092***
	(0.014)	(0.026)	(0.015)
Observations	3,640	3,637	3,640

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses
Note: Marginal coefficients from Probit model presented

*Table B2: Impact of the El Dorado Promise on AA Completion without Controlling for High School GPA*

	(1) Overall Impacts	(2) Impacts by Race	(3) Impacts by GPA
Elig*Post	**0.037**		
	(0.036)		
Elig*Post*Of Color		**0.031**	
		(0.038)	
Elig*Post*White		**0.045**	
		(0.037)	
Elig*Post*Top 50% GPA			**0.047**
			(0.036)
Elig*Post*Bottom 50% GPA			**0.025**
			(0.036)
Promise Eligible	0.003	0.002	0.002
	(0.031)	(0.031)	(0.031)
Post Promise Announcement	0.031	0.029	0.031
	(0.040)	(0.039)	(0.039)
Female	0.009	0.009	0.006
	(0.010)	(0.010)	(0.010)
Student of Color	-0.036***	-0.025	-0.030***
	(0.010)	(0.020)	(0.011)
Observations	3,132	3,132	3,132

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses
Note: Marginal coefficients from Probit model presented

Table B3: Impact of the El Dorado Promise on BA Completion without Controlling for High School GPA

	(1) Overall Impacts	(2) Impacts by Race	(3) Impacts by GPA
Elig*Post	**0.110****		
	(0.054)		
Elig*Post*Of Color		**0.113***	
		(0.058)	
Elig*Post*White		**0.106***	
		(0.055)	
Elig*Post*Top 50% GPA			**0.223*****
			(0.047)
Elig*Post*Bottom 50% GPA			**-0.121****
			(0.051)
Promise Eligible	0.058	0.059	0.044
	(0.040)	(0.040)	(0.035)
Post Promise Announcement	-0.048	-0.047	-0.039
	(0.059)	(0.059)	(0.052)
Female	0.078***	0.078***	0.041**
	(0.017)	(0.017)	(0.017)
Student of Color	-0.226***	-0.231***	-0.146***
	(0.016)	(0.028)	(0.016)
Observations	2,296	2,296	2,296

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Standard errors in parentheses
Note: marginal coefficients from Probit model presented

Appendix C: Enrollment Analyses by Institution Location and Type
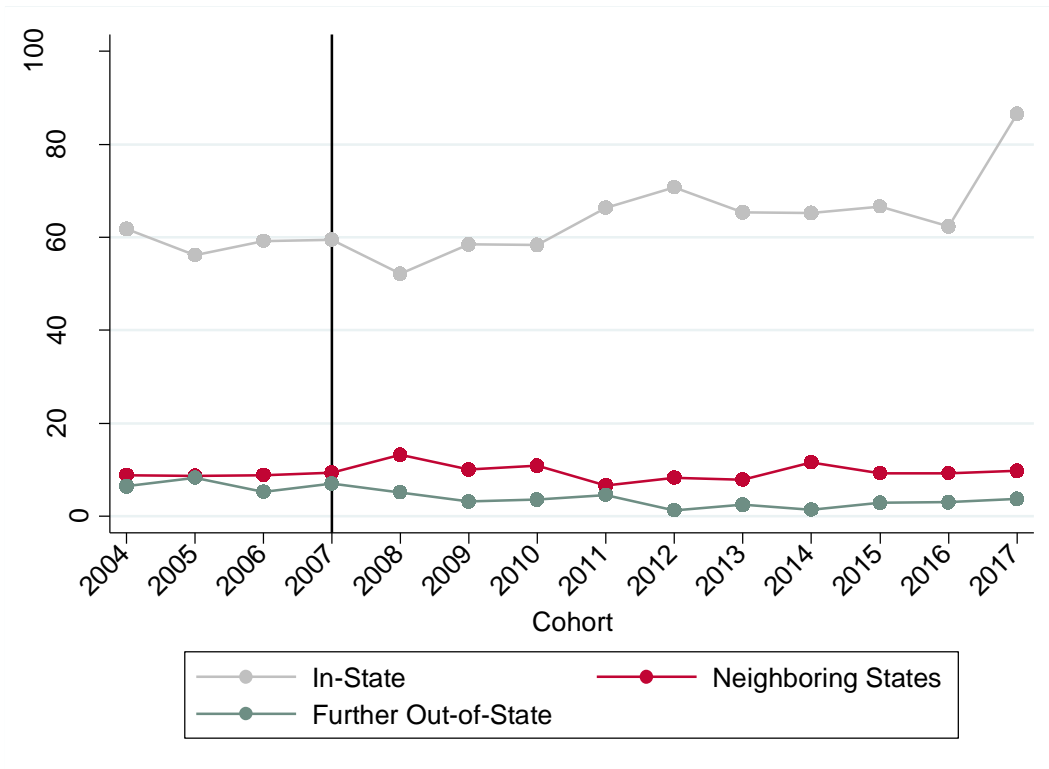
Figure C.1: Enrollment Patterns of El Dorado Graduates Over Time by Institution Location

Table C.1: Impact of the El Dorado Promise on Instate Postsecondary Enrollment

	(1) Overall	(2) By Student Race	(3) By High School GPA
Elig*Post	**0.048**		
	(0.048)		
Elig*Post*Of Color		**0.074**	
		(0.050)	
Elig*Post*White		**0.014**	
		(0.049)	
Elig*Post*Top 50% GPA			**0.011**
			(0.049)
Elig*Post*Bottom 50% GPA			**0.107****
			(0.050)
Promise Eligible	0.030	0.035	0.020
	(0.041)	(0.040)	(0.040)
Post Promise Announcement	0.013	0.024	0.015
	(0.056)	(0.056)	(0.056)
Cumulative High School GPA	-0.089***	-0.089***	
	(0.010)	(0.011)	
Top 50% GPA			-0.016
			(0.025)
Female	0.040***	0.040***	0.029**
	(0.014)	(0.014)	(0.014)
Student of Color	0.055***	0.013	0.081***
	(0.015)	(0.026)	(0.014)
Observations	2,784	2,781	2,784

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses
Note: Marginal coefficients from Probit model presented
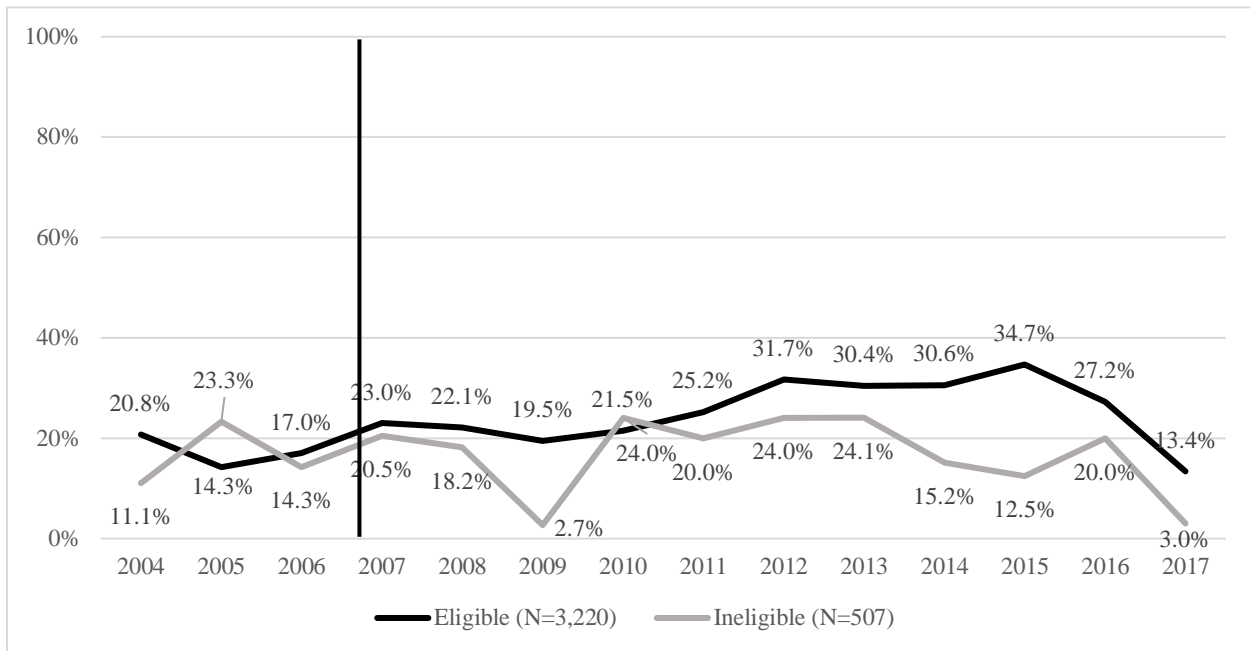
Figure C.2: Percent of El Dorado Students Enrolled in a 2-Year College within 6 Months of High School Graduation, by Promise Eligibility
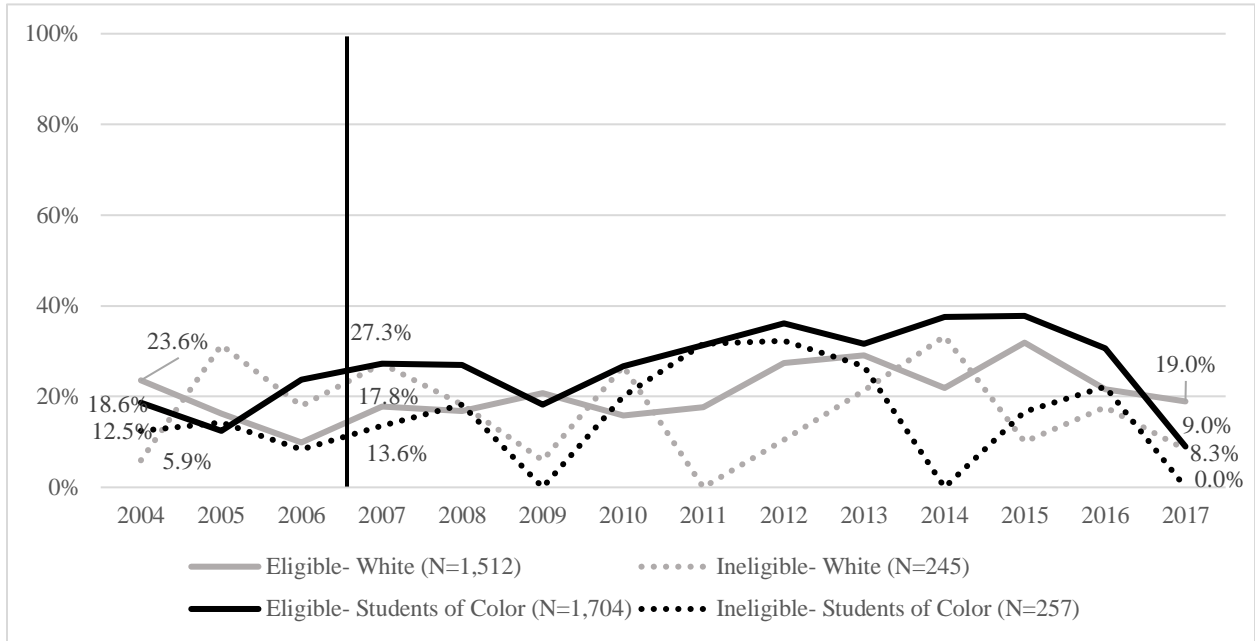
Figure C.3: Percent of El Dorado Students Enrolled in a 2-Year College within 6 Months of High School Graduation, by Promise Eligibility and Race
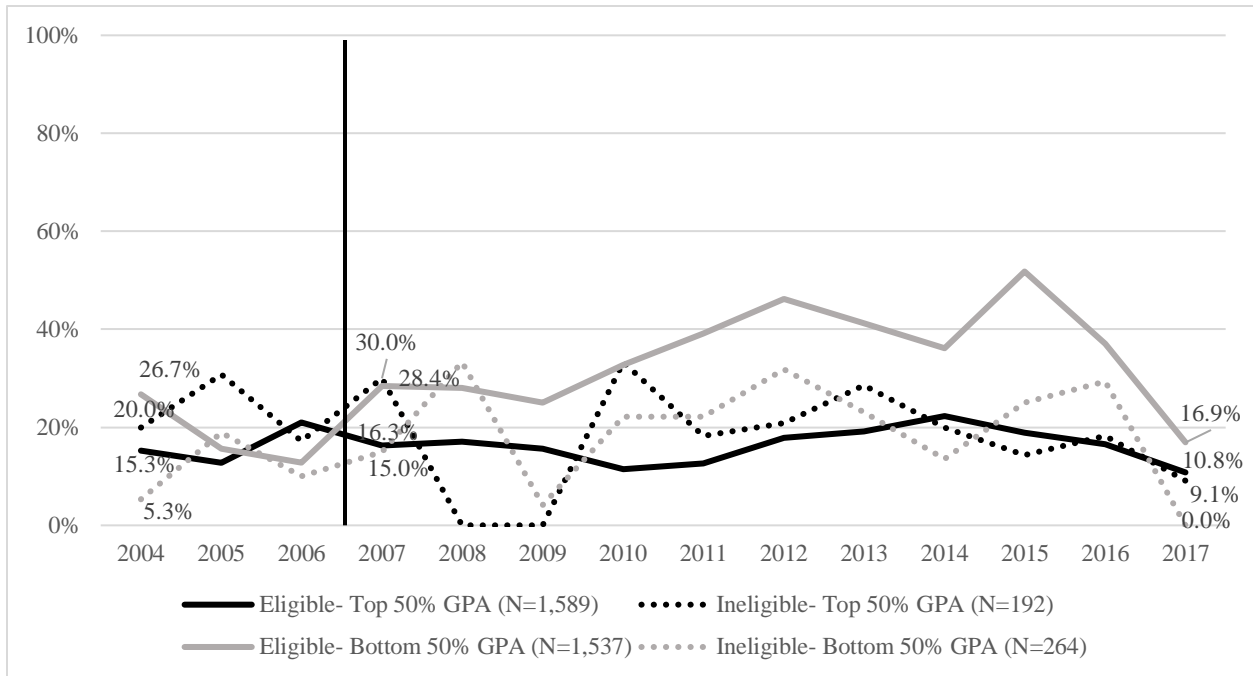
Figure C.4: Percent of El Dorado Students Enrolled in a 2-Year College within 6 Months of High School Graduation, by Promise Eligibility and High School GPA
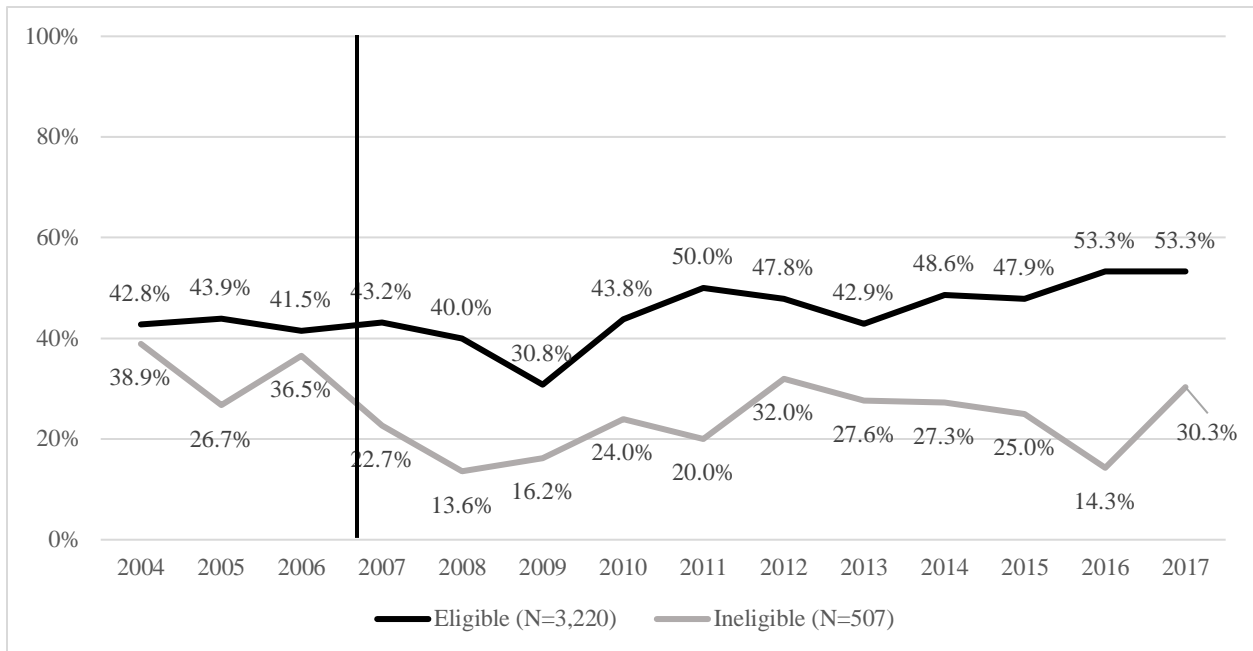
Figure C.5: Percent of El Dorado Students Enrolled in a 4-Year University within 6 Months of High School Graduation, by Promise Eligibility
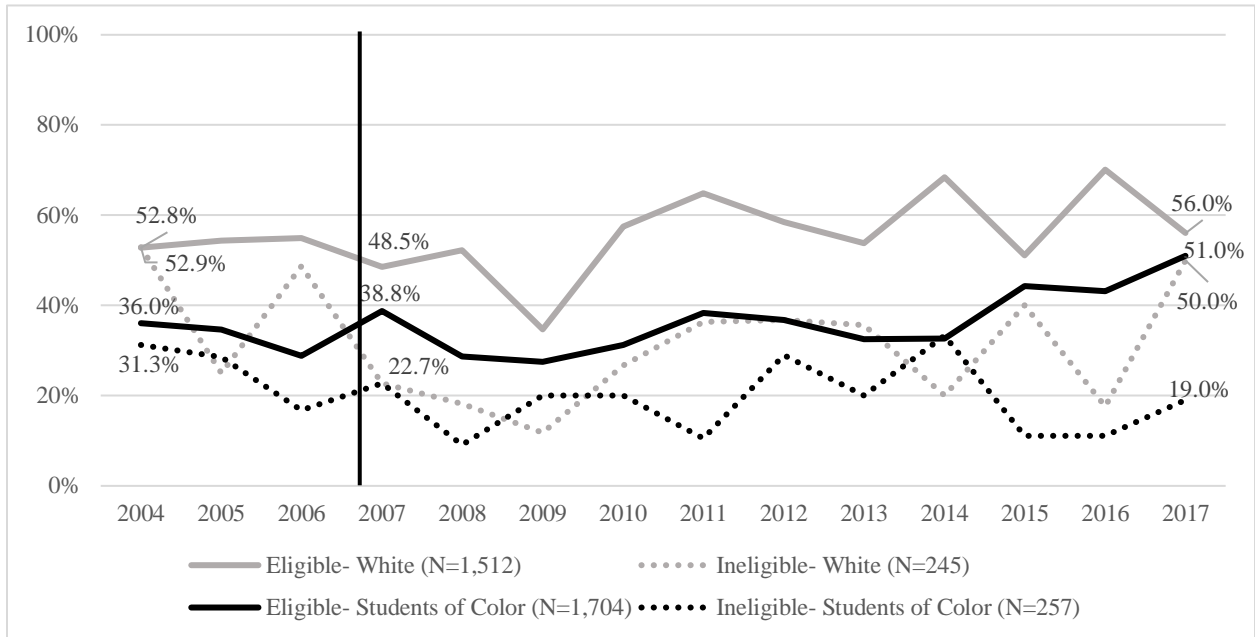
Figure C.6: Percent of El Dorado Students Enrolled in a 4-Year University within 6 Months of High School Graduation, by Promise Eligibility and Race
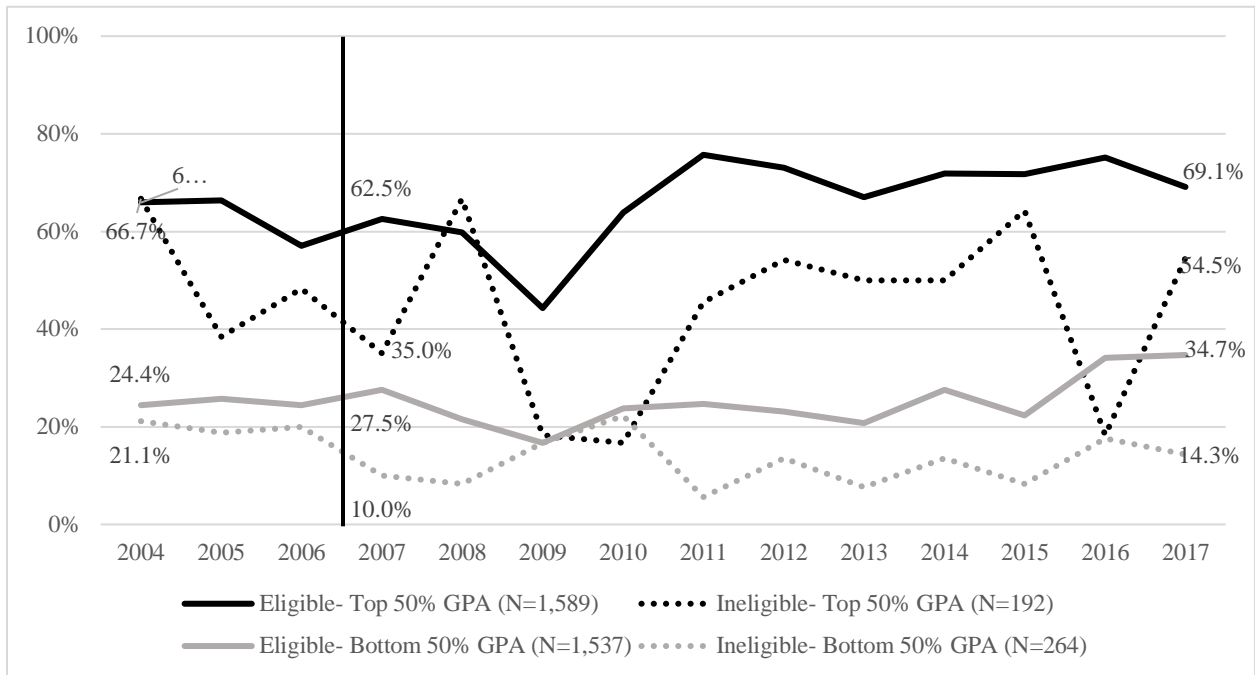
Figure C.7: Percent of El Dorado Students Enrolled in a 4-Year University within 6 Months of High School Graduation, by Promise Eligibility and High School GPA

Table C.2: Impact of the El Dorado Promise on Postsecondary Enrollment, by Institution Type

	(1)	(2)	(3)	(4)	(5)	(6)
	4-Year University Enrollment			2-Year College Enrollment		
	Overall	By Student Race	By Student GPA	Overall	By Student Race	By Student GPA
Elig*Post	**0.103***			**0.041**		
	(0.053)			**(0.054)**		
Elig*Post*Of Color		**0.103***			**0.060**	
		(0.056)			**(0.057)**	
Elig*Post*White		**0.106***			**0.010**	
		(0.056)			**(0.056)**	
Elig*Post*Top 50% GPA			**0.124****			**-0.054**
			(0.056)			**(0.054)**
Elig*Post*Bottom 50% GPA			**0.069**			**0.112****
			(0.056)			**(0.054)**
Promise Eligible	0.037	0.037	0.071	0.043	0.046	0.029
	(0.046)	(0.046)	(0.045)	(0.048)	(0.048)	(0.046)
Post Promise Announcement	0.087	0.082	0.090	-0.057	-0.050	-0.062
	(0.063)	(0.063)	(0.065)	(0.063)	(0.063)	(0.061)
Cumulative High School GPA	0.307***	0.307***		-0.130***	-0.130***	
	(0.009)	(0.009)		(0.010)	(0.010)	
Top 50% GPA			0.302***			-0.025
			(0.027)			(0.027)
Female	-0.031**	-0.032**	0.004	0.073***	0.074***	0.061***
	(0.015)	(0.015)	(0.015)	(0.014)	(0.014)	(0.014)
Student of Color	0.024	0.026	-0.042***	-0.029*	-0.066**	-0.005
	(0.016)	(0.029)	(0.016)	(0.016)	(0.029)	(0.015)
Observations	3,502	3,499	3,502	3,502	3,499	3,502

*** p<0.01, ** p<0.05, * p<0.1*
Standard errors in parentheses
Note: Marginal coefficients from Probit model presented

Appendix D: Robustness Check of Parallel Trends

Table D.1: "Impact" of the El Dorado Promise Program on Student Demographics

	(1) Female	(2) Of Color	(3) GPA
Eligible*Post	**0.049**	**-0.086**	**0.076**
	(0.057)	**(0.057)**	**(0.086)**
Promise Eligible	-0.041	0.085*	0.114
	(0.049)	(0.049)	(0.074)
Post Promise Announcement	-0.066	0.101*	0.002
	(0.051)	(0.052)	(0.079)
Observations	3,646	3,640	3,506
R-squared			0.007

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses
Linear probability models used for gender and race
OLS linear regression model used for GPA

Chapter 3: Examining the Role of On-Campus Support Services in Facilitating the Transition to College

I.   Introduction

The share of high school graduates who enroll in a postsecondary institution, whether a two or four-year public, private, non-profit, or for-profit institution, increased from 63 percent to 70 percent between 2000 and 2016 (National Center for Education Statistics, 2018). However, the six-year graduation rate for first-time enrollees was just 58.3 percent in 2018 (Shapiro et al., 2018). Taken as a whole, the share of young adults with a bachelor's degree has grown slowly over the past four decades; the share of 25-29-year-old adults holding a bachelor's degree grew from 21 percent to 33 percent between 1975 and 2015 (Ryan & Bauman, 2016). Further, there are large gaps in rates of postsecondary completion between students with different backgrounds. While 63.9 percent of first-time, full-time white students who entered a four-year university in 2010 completed their bachelor's degree within six years, only 39.7 percent of black students and 54.4 percent of Latino/a students completed a bachelor's degree within six years (National Center for Education Statistics, 2016). Additionally, there were large gaps in bachelor's degree completion rates between students from different Asian Pacific Islander backgrounds, with completion rates ranging from 4 percent to 76 percent (Museus, 2013). Holding a postsecondary credential is increasingly the gateway to a higher income, certain indicators of health, and other quality of life indicators, in addition to positive social benefits (McMahon, 2018; Oreopoulos & Petronijevic, 2013; Oreopoulos & Salvanes, 2011; Autor, 2014; Galama, Lleras-Muney, & van Kippersluis, 2018). However, individuals have unequal access to these outcomes due to inequities in postsecondary credential accumulation.

Postsecondary institutions are increasingly focused on improving degree completion rates, particularly as more states adopt performance-based funding structures (Snyder & Fox, 2016). There is some evidence to suggest that as states tie funding to degree outcomes and, in particular, outcomes for students from historically underrepresented backgrounds, universities are investing more heavily in student support services (Kelchen & Stedrak, 2016). Universities are working collaboratively to diversify campuses, increase first to second-year persistence, and increase graduation rates through organizations such as the American Association of State Colleges and Universities and the Association of Public and Land-Grant Universities. These efforts are examples of universities engaging in action research to promote student success. However, it is important to understand the context in which these efforts are playing out; specifically, it is critical to understand the extent to which current student support services facilitate postsecondary completion, which students utilize on-campus resources, and what barriers prevent students from accessing these resources.

In this chapter, I examine on-campus student support services from three perspectives. First, I use the Beginning Postsecondary Study: 2012/14 to examine the association between support service utilization and postsecondary persistence, as well as potential mechanisms by which support services may facilitate student outcomes. Second, I use a detailed campus-wide survey administered at the University of Arkansas-Fayetteville to examine the extent to which students utilize on-campus resources, predictors of resource utilization, and the association between resource utilization and feelings of belongingness. Finally, I conduct interviews with current students at the University of Arkansas-Fayetteville to gain insight into students' experiences with on-campus resources, including how they become aware of different on-campus resources, which ones are most impactful for their collegiate experience, and what

challenges they experience when attempting to utilize these resources. By using a multi-tiered lens to examine student support services, I am better able to describe the structures currently in place to facilitate postsecondary completion and to identify currents strengths and areas of improvement for these resources.

I find that, nationally, the majority (over 69 percent) of students report using academic advising services, but less than 40 percent of students report using academic support services. At a large, flagship state university, I find that 60-76 percent of students use at least some on-campus resources, and about 53 percent use at least three types of resources. Further, there are differences in characteristics between students who are likely to use and who are not likely to use on-campus support services. Specifically, students with lower achievement throughout high school and students from lower-income families are less likely to use on-campus resources, while more extraverted, neurotic, higher-income, and previously higher-achieving students are more likely to utilize on-campus support services. Students identify professors and resident assistants as important but inconsistent sources of information about the availability of on-campus resources. Further, students identify logistical hurdles, peer warnings, and personal stigmas as barriers to accessing resources.

The remainder of this chapter proceeds as follows: First, I discuss the literature examining barriers to postsecondary degree completion and promising strategies for improving student outcomes. Next, I describe the Beginning Postsecondary Study, my methods of analysis, and results. I then discuss the on-campus survey administered at the University of Arkansas, strategies for analysis, and results. Fourth, I describe the student interviews and main themes revealed through those conversations. Finally, I synthesize my findings across data sources and analyses and offer suggestions for future research and practice.

II.   Prior Literature

Historically, higher education has been the province of elite, wealthy, white men in the United States; the majority of men did not enroll in college until about 1945, and the majority of women did not enroll in college until about 1950 (Goldin & Katz, pp. 250). As such, the traditional organization of postsecondary institutions was not designed with certain populations in mind, creating barriers to success. In particular, students of color (Conrad & Gasman, 2015; Flores & Park, 2013; Hurtado & Carter, 1997), first-generation students (Engle, 2007), students coming from the foster care system (Cutler White, 2018; Fox & Zamani-Gallaher, 2018; Salazar, Jones, Emerson, & Mucha, 2016), and students with psychiatric disabilities (Jones, Brown, Keys, & Salzer, 2015) have been identified as particularly at risk of being left behind by current institutional structures.

In addition to student characteristics, certain institutional characteristics correlate with students' postsecondary outcomes. For example, counter to overall trends in postsecondary completion, students of color who enroll at a minority-serving institution in Texas complete a postsecondary credential at the same rate as white students (Flores & Park, 2013). Researchers characterize minority-serving institutions as student-centered, adaptable organizations determined to meet their students' unique challenges to promote success (Conrad & Gasman, 2015). In a national quasi-experimental study, Melguizo (2010) finds that students of color are more likely to persist and complete a bachelor's degree than their peers with similar background characteristics and levels of prior achievement when they enroll in more selective institutions. Universities can also experiment with different pedagogical approaches that may promote student success, such as active learning or promoting a balance between face-to-face and online instruction (Braxton, Milem, & Sullivan, 2000; Shea & Bidjerano, 2018).

Theoretical models of postsecondary persistence and completion incorporate the academic, social, and psychological needs of students transitioning into college and into adulthood. Tinto (1993) emphasizes that the college setting has both an academic and social system, with each comprised of various subcultures with their own norms, values, and expectations (pp. 104-105). If students are not able to establish an interactive membership with a particular community, Tinto argues, they will be at greater risk of dropping out (1993, pp. 106). Empirically, researchers find that students' sense of belonging in individual classes and in the postsecondary setting more broadly is associated with motivation in particular classes and persistence (Freeman, Anderman, & Jensen, 2007; Braxton, Milem, & Sullivan, 2000). Recent models of student persistence emphasize the importance of creating culturally responsive and culturally relevant environments that do not require students to choose between their cultural background and a stereotypical college-student identity (e.g. Museus, Yi, & Saelua, 2017). Additionally, psychologists emphasize the importance of recognizing the unique developmental needs of emerging adulthood to allow students to thrive in the postsecondary setting (e.g. Demetriou & Powell, 2015).

Researchers have tested many hypotheses stemming from these theoretical models of student persistence in postsecondary education. The literature largely affirms the importance of developing a strong sense of belonging and building meaningful interpersonal relationships on campus. Faculty play a significant role in creating an environment in which students can succeed, with research indicating that as faculty become more engaged, student-centered, and culturally responsive in their practice, student retention and completion may increase (Means & Pyne, 2017; Stevenson, Buchanan, & Sharpe, 2007; Kinzie, 2005; De Sousa, 2005; Hurtado & Carter, 1997). Extra-curricular opportunities to engage with a broader community, such as

undergraduate research, cohort-based learning communities, and Greek life, can also improve students' performance, retention, and degree completion (Collins et al., 2017; Xu, Solanki, McPartlin, & Sato, 2018; Byun, Irvin, & Meece, 2012). These interventions help students create membership within particular communities on campus, increasing their sense of belonging and postsecondary outcomes.

Research also indicates the importance of affirming students' identities. Means and Pyne (2017) find that identity-based centers, such as multicultural student centers or Latino/a student organizations, help students develop positive self-images as college students and increase their sense of belonging on campus. The spaces and organizations that foster a sense of belonging may vary between student groups. For example, Vaccaro and Newman's (2016) qualitative findings suggest that white students may feel a strong sense of belonging in their campus community when they have friends with whom they are able to have fun and enjoy themselves, while students of color may feel a greater sense of belonging when they are able to build deep, authentic relationships with others.

Interventions designed to address specific challenges students face can also increase persistence and degree completion. For example, Mabel and Britton (2018) find that 33 percent of college dropouts left after completing 75 percent of their graduation requirements and that a lack of preparedness for upper-level courses or a lack of awareness of degree requirements may contribute to this pattern of late departure. An evaluation of the federal Student Support Services program (a TRIO program), and academic advising, in particular, finds these services lead to increased rates of persistence and degree completion (Zhang, Chen, Hale, & Kirshstein, 2005). Additionally, increases in financial aid, whether in the form of work-study, loans, or scholarships/grants, are linked to increases in student persistence and degree completion (Scott-

Clayton & Zhou, 2017; Dynarski & Scott-Clayton, 2013; Denning, 2018; DesJardins & McCall, 2010). Finally, research indicates the efficacy of comprehensive supports for students facing a variety of barriers to postsecondary support (Jones, Brown, Keys, & Salzer, 2015; Cutler White, 2018; Daugherty, Johnston, & Tsai, 2016; Means & Pyne, 2017), especially those programs that allow students to maintain a relationship with a staff member over time (Salazar, Jones, Emerson, & Mucha, 2016; Engle, 2007).

Postsecondary success is the product of a complex interplay among academic performance, social networks, and personal development. When universities provide support to students along these dimensions, students from various backgrounds can overcome a myriad of obstacles to obtain a postsecondary credential. However, universities cannot force students to utilize resources designed to facilitate their success, nor can universities compel students to disclose all the challenges they may be facing during their postsecondary experience. Indeed, while there have been numerous studies looking at specific interventions within certain vulnerable student populations, there is a dearth of knowledge about current student utilization of on-campus resources among the general student body. Specifically, we know little about the extent to which students voluntarily utilize on-campus resources such as academic advising, tutoring, multicultural spaces, or mental health services. Further, we do not know how students learn about these services, what challenges they encounter when attempting to utilize these resources, or how these services shape students' collegiate experiences.

I address these gaps in the literature by asking three related sets of questions using three distinct analytical approaches. First, I use a nationally representative survey to provide a high-level overview of which students are most likely to utilize on-campus resources as well as to suggest potential ways in which support services shape students' collegiate experiences. Next, I

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look specifically at the University of Arkansas-Fayetteville, which is in a state with a performance-based funding formula, to gain a more detailed understanding of which students are most likely to use on-campus support services, how frequently students use these services, and how many services students tend to utilize. Finally, I conduct a series of interviews with current undergraduate students at a four-year university to understand students' experiences with on-campus services, including how they learn of these resources, what challenges they face in accessing these resources, and how these services shape their overall collegiate experience. Each approach has distinct advantages. The national survey allows me to paint a broad, representative picture of the current state of service utilization and suggests ways in which on-campus resources are serving students, but does not provide many details about what resources students are using or how frequently. The campus survey allows me to go into greater detail about which services students utilize and how frequently. Further, I am able to look at differences in service utilization based not just on basic demographics, but also by differences in personality, which prior work has linked to differences in academic achievement, major selection, grade point average, and college completion (Humburg, 2017; Lundberg, 2013; Kappe & van der Flier, 2012; Poropat, 2009; Lufi, Parish-Plass, & Cohen, 2003). Finally, the student interviews add nuance to our understanding of how students interface with on-campus support services. All three analyses suggest areas for future research while describing the current state of support services at two and four-year postsecondary institutions.

III.   National Overview

In this section, I look descriptively at national patterns in student services utilization. I use the Beginning Postsecondary Students Longitudinal Study: 2012/14 (BPS: 12/14) to provide a national representative overview of the extent to which students utilize on-campus resources,

which student characteristics predict resource utilization, and whether or not resource utilization predicts persistence and a sense of belonging. I begin by describing the dataset, then discuss the methods used and present results.

A. Data

The Beginning Postsecondary Students Longitudinal Study (BPS) is a nationally representative longitudinal survey designed, administered, and maintained by the National Center for Education Statistics (NCES). A subset of students who participate in the National Postsecondary Student Aid Study (NPSAS) is selected to participate in the BPS; the BPS: 12/14 draws from the pool of students who completed the 2011-12 NPSAS. Students are initially surveyed in 2011-12, then again in 2014, during a survey window that begins in February 2014 and ends in November 2014. Additionally, NCES obtains administrative records through the National Student Clearinghouse, the Central Processing System, and the National Student Loan Data System to include enrollment and financial aid information in the BPS (Hill et al., 2016). The sample is stratified by institution type as well as students' degree type and major; weights are included to adjust for nonresponse and to account for the unequal likelihood of selection into the survey across institutions and students (Hill et al., 2016).

Because I have access to students' responses from 2014, I observe students' persistence decisions in their second year. As additional waves of the survey become available[24], researchers could examine the relationship between service utilization and degree completion. Additionally,

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[24] Prior waves of the BPS include measures of degree completion; however, prior waves surveyed students who began college in 1990, 1996, and 2004, respectively, before states implemented performance-based funding schemes that prioritized student retention and completion (Dougherty et al., 2014). Thus, prior waves do not provide direct information on how students interact with on-campus support services in the current policy context. Additionally, the BPS: 12/14 asked students directly about their utilization of academic advising, financial aid advising, and career services (Hill et al., 2016), while prior waves did not (e.g. Wine, Cominole, Caves, & Hunt-White, 2009).

researchers could conduct path analyses to examine whether the mechanism underlying this relationship is students' sense of belonging. The BPS: 12/14 restricted-use dataset includes 20,310 observations.[25] I first restrict this sample to students in two or four-year institutions, reducing my sample to 19,440. This sample restriction allows me to focus on students in more traditional postsecondary settings who likely interact with support services that are oriented towards similar goals and work within similar structures. I further limit my analytic sample to students with complete information; with these restrictions, my analytic sample contains 14,480 observations. Table 1 presents the demographics of students in my analytic sample. I calculate all descriptive statistics using the recommended survey weights and bootstrapping procedures described in Hill et al. (2016).

As shown in Table 1, white students comprise just over half the sample; Latino/a students comprise the second largest group in the sample, followed by Black students, Asian students, multiracial students, American Indian/Alaskan Native, and Native Hawaiian/Pacific Islander students. Female students comprise 55 percent of the respondents. Slightly less than 20 percent of students surveyed are the first in their immediate family to attend college. The majority of students surveyed in the BPS:12/14 are enrolled at four-year institutions, with 42 percent of students enrolled in two-year institutions.

Table 2 presents additional demographic characteristics of the sample used in the analyses presented below. These summary statistics of continuous variables are calculated using the sample weights recommended by NCES and bootstrapping replication procedures for variance estimation (Hill et al., 2016).

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[25] In compliance with NCES regulations, all observations are rounded to the nearest 10 to protect respondents' anonymity.

The average age of a respondent is about 19-20 years of age, with an expected family contribution of $13,000. Students report an average high school GPA of about six on a seven-point scale; average SAT scores are similarly respectable, with an average of about 1019. On average, students travel 150 miles from their homes to their institution of higher education. With this understanding of the data source used for my first research question, I turn now to the analytic strategy for this section of the paper.

B. Analytic Strategy

My aim is to provide a descriptive overview of the extent to which students utilize on-campus support services, which student characteristics predict resource utilization, and whether resource utilization predicts second-year persistence and a sense of belonging. I first calculate the share of students who report using any on-campus support services, then break out results by type of support service: academic advising, academic support services, career services, or financial aid advising. Next, I run discrete choice Probit models expressing the likelihood of resource utilization as a function of student characteristics, a vector of state fixed effects, and a vector of institution type fixed effects. I employ student-level weights and bootstrapping variance estimation procedures as recommended by the BPS:12/14 to account for non-response and the stratified sampling procedures used for data collection (Hill et al., 2016). This model can be expressed as:

$$(1) \quad P(y = 1|x) = \Phi(\beta_0 + \boldsymbol{\gamma stuchars} + \boldsymbol{\tau State} + \boldsymbol{\varphi instsector} + \varepsilon_i),$$

where outcome y is a dummy variable indicating, in turn, using no on-campus support services, using academic advising, using academic support services, using career services, and using financial aid advising. The vector $stuchars$ includes student age, race, gender, expected family

contribution, high school GPA, composite SAT score[26], distance between a student's home and first institution, and an indicator for whether or not the student is a first generation student. I also include state and institution sector fixed effects, captured by τ and φ, respectively.

I then express an indicator of second-year persistence as a function of on-campus resource utilization, student characteristics, institution type, a vector of state fixed effects, and institution sector effects. I again employ student-level weights as recommended by the BPS:12/14 technical manual and bootstrap standard errors. This model can be expressed as:

(2) $P(y = 1|x) = \Phi(\beta_0 + \delta support_i + \boldsymbol{\gamma stuchars} + \boldsymbol{\tau State} + \boldsymbol{\varphi instsector} + \varepsilon_i),$

where t $y = 1$ indicates second-year persistence. I first define $support$ as a dichotomous indicator of whether the student reported not using on-campus resources, then include an indicator for each specific type of support service included on the survey: academic advising, academic support services, career services, and financial aid advising. The remaining control variables are as described above.

As an exploratory analysis of a potential mechanism by which support service utilization could improve postsecondary outcomes, I also model the relationship between students' sense of belonging and support service utilization. As Tinto (1993) and others theorize, finding community on campus is an important aspect of students' collegiate experiences and may be necessary for student success. The survey included a single item measuring the extent to which students felt like they belonged on campus. Students respond to the belonging item on a 5-point scale. I dichotomize this variable, coding students as one (high belonging) if their response is "strongly agree" and as zero (low belonging) if their response is anything else.[27] I regress this

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[26] For students who submitted ACT scores, scores were converted onto the SAT score by NCES.
[27] A descriptive histogram of students' responses to this item indicated that almost 50 percent of students marked "strongly agree" to the question, leading me to split the sample in this way. In an alternative specification that takes

indicator of belongingness on an indicator of whether or not they used on-campus resources, student characteristics, a vector of state indicators, and institution sector fixed effects. This Probit model is given by:

$$(3) \qquad P(y = 1|x) = \Phi(\beta_0 + \delta support_i + \boldsymbol{\gamma stuchars} + \boldsymbol{\tau State} + \boldsymbol{\varphi instsector} + \varepsilon_i).$$

With this description of the analytic strategy used to answer my first research question, I turn now to the results of these analyses.

C. Results

Before presenting the results related to the predictors of the use of support services, it is helpful to know the extent to which students use on-campus support services at all. Among my analytic sample, 89% of students report using some support service on campus. When broken down into different types of services, 69.4 percent of students report using academic advising, 36.4 percent report using academic support services, 17.0 percent report using career services, and 55.7 percent report using financial aid advising. I turn now to the results of my analysis of the predictors of on-campus resource utilization, then discuss the relationship between service utilization and persistence before concluding by presenting the relationship between resource use and a sense of belonging.

1) Predictors of On-Campus Service Utilization

Table 3 presents the marginal effects from the Probit models predicting, in turn, utilization of academic advising, academic support services, career services, financial aid services and no services as a function of student characteristics, as described in Equation (1).

As shown in Table 3, older students are significantly less likely to report using academic advising but are slightly more likely to use academic support services. Native Hawaiian/ other

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into account the full distribution of responses, I standardize the variable and treat belongingness as a continuous variable. The results from this analysis are presented in Appendix A.

Pacific Islander students are 7.6 percentage points more likely to use academic advising than white students; there are no other differences in reports of use of academic advising by student race. However, there are differences by race in use of other on-campus resources.[28] Black, Latino/a, Asian, and Native Hawaiian/other Pacific Islander are about six percentage points more likely than white students to report using academic support services, career services, and financial aid advising. Multiracial students are about five percentage points more likely than white students to use academic support services and financial aid advising.

Students from higher-income families are more likely to use academic advising and academic support services, but are less likely to use financial aid advising. Differences in service utilization by family income are slight, however; an increase in family wealth represented by a $1,000 increase in expected family contribution is associated with a 0.1 percentage point increase in the likelihood of utilizing academic advising and a 0.5 percentage point decrease in the likelihood of utilizing financial aid advising. Female students are 4.4 percentage points more likely than male students to use any on-campus resource, and are significantly more likely to use academic advising, academic support services, and financial aid services. Students with higher levels of academic preparation, measured both by high school GPA and SAT score, are more likely to report using any on-campus service, but this difference is slight, about a half of a percentage point. First generation students are less likely to use academic advising and career services than continuing generation students but are three percentage points more likely to use financial aid advising.

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[28] These results are robust across model specifications. In particular, race is only weakly correlated with first generation status (no correlation above 0.11; full correlation matrix available upon request), and results do not change when first generation status is omitted as an explanatory variable.

Overall, Table 3 indicates that higher-achieving students, female students, and students of color are more likely to report using on-campus support services. It is encouraging that students of color are often utilizing on-campus support services, as prior research indicates students of color, in particular, may benefit from engaging in affirming, academically supportive environments (e.g., Means & Pyne, 2017; Conrad & Gasman, 2015). However, first-generation students are less likely to utilize academic and career-centered services, students from lower-income families are less likely to use academic advising and academic support services, and students who are lower-achieving in high school are less likely to use academic and career services. Although differences in usage between these groups are small, these patterns may still be of concern to universities, since these student populations tend to be at higher risk of dropping out (e.g. Mabel & Britton, 2018; Engle, 2007; Walpole, 2003; Terenzini, Cabrera, & Bernal, 2001). Universities may therefore be particularly interested in how to expand access to on-campus resources to these students. With this understanding of the differences in which students are likely to utilize on-campus resources, I turn now to look at the consequences of utilizing (or not) these services.

2) On-Campus Service Utilization and Second-Year Persistence

This section explores the relationship between on-campus service utilization and persistence into students' second year in college. Students are counted as persisting if, in 2014, they report either still being enrolled in higher education or if they report having already completed their degrees. Students are first surveyed in the 2011-12 school year when they are first-time college students; the first follow-up survey is administered between February and November 2014, spanning the spring semester of their second year and the fall semester of their third year. Table 4 presents the relationship between service utilization and persistence. I include

indicators of service utilization in students' first year (2011-12) as the main explanatory variables.

As shown in Table 4, the use of academic advising, academic support services, and career services are positively associated with second-year persistence, even after controlling for student demographics, prior achievement (high school GPA and composite SAT score), state fixed effects, and institution sector fixed effects. In confirmation of this result, students who report using no services in their first year are 3.7 percentage points less likely to persist beyond their first year. Consistent with prior research, older students, Black students, students from lower-income families, male students, lower-achieving students, and first-generation students all have lower likelihoods of persistence in this sample.

Use of on-campus support services is significantly and positively related to second-year persistence, but the mechanism by which these services facilitate student success is unclear. These services could help students build useful skills that allow them to succeed academically, or students may find membership in a community on campus by engaging with these resources. It could also be that characteristics not measured by the BPS: 12/14, such as students' personality or family pressures, influence both students' likelihood of utilizing on-campus resources and of persistence. I am not able to make causal claims about the impact of support services on college persistence with this analysis, as students choose whether or not to use on-campus resources and these decisions may be correlated with unmeasured factors that also affect students' persistence decisions; I am only presenting descriptive associations between resource utilization and persistence. As an exploratory analysis, however, it is interesting to look at a potential mechanism by which support services could influence students' experiences and outcomes. Namely, theorists emphasize the importance of a sense of belonging for student persistence and

eventual degree attainment (e.g. Tinto, 1993; Freeman, Anderman, & Jensen, 2007; Braxton, Milem, & Sullivan, 2000). Therefore, I look next at the relationship between students' sense of belonging and on-campus resource utilization.

3) On-Campus Service Utilization and Sense of Belonging

Table 5 presents the results of my analysis looking at the relationship between on-campus resource utilization and students' sense of belonging on campus. Unlike above, there is not a lag between service utilization and the outcome measure; students in their first year (2011-12) report service utilization, which is also when students report the extent to which they "felt like a part of the institution." While the simultaneous measure of service utilization and a sense of belonging allows for the potential of reverse causality, whereby students who feel a greater sense of belonging are more likely to use on-campus resources, this approach has two main advantages over measuring sense of belonging in 2014. First, such an analysis would limit my sample just to students who persisted into their second year, which would also introduce concerns of a bidirectional relationship between belonging and service utilization. Second, I am not making any causal claims in this analysis; my objective is simply to present a descriptive overview of which students use on-campus resources and the correlates of such resource utilization. Thus, the use of a larger, more representative sample is more important than a clean identification of a unidirectional relationship between service utilization and a sense of belonging.

As shown in Table 5, the use of on-campus services is positively and significantly associated with students' sense of belonging. Specifically, the use of academic advising, the use of academic support services, and the use of financial aid services are each associated with a two to three percentage point increase in the likelihood a student will report a strong sense of belonging. The relationship between the use of career services and belongingness is even

stronger; students who report using career services are 6.9 percentage points more likely to report a strong sense of belonging. Conversely, students who report using no on-campus services are 5.5 percentage points less likely to report a strong sense of belonging. There are few differences in sense of belonging by student race, gender, or first-generation status. However, students from higher income families report feeling more connected to their institution than their peers from lower income families. Interestingly, while students with higher reported high school GPAs report higher levels of belongingness, students with higher SAT scores report lower levels of campus belongingness. This incongruity points to a need for further exploration of the relationship between prior achievement and sense of belonging. There is only a 0.37 correlation between students' high school GPA and SAT score, indicating these measures are capturing different domains of students' baseline capabilities; the SAT score may be capturing more of students' cognitive ability, while high school GPA may be capturing more of students' non-cognitive ability. Certain non-cognitive skills that are rewarded by classroom grades, such as timeliness, conscientiousness, or the ability to work in a group, may also facilitate students' social integration at a university, while intellectual ability alone may not facilitate such engagement.

The data from the BPS:12/14 present only a broad outline of whether and how students engage with on-campus support services. For example, students report whether they have ever used services in each of four broad sectors of campus life, but not the frequency with which they use these resources. Additionally, the BPS provides a standard set of demographic variables, but does not measure all student characteristics that may influence whether students utilize on-campus services. In the next section, I present results from an institution-specific survey that

allows me to go into greater detail when describing whether and how students engage with on-campus services as well as which students are more likely to utilize these resources.

IV.   Student Survey at the University of Arkansas

In this section, I describe the results of a student survey deployed at the University of Arkansas-Fayetteville (U of A), the state's flagship university. Snyder and Fox (2016) classify Arkansas' higher education funding system as a Type 3 performance-based funding system, which means universities' funding substantially depends on how well they perform relative to the state's rubric. Further, all institutions of higher education are subject to performance-based funding, and outcomes for historically underrepresented students are given additional weight in the rubric (Snyder & Fox, 2016). The U of A is investing heavily in efforts to promote student retention and degree completion by reorganizing the administration of on-campus resources and committing additional funding to student services (University of Arkansas, 2017). Thus, the U of A is an ideal location for a study to examine students' experiences with on-campus resources, including the extent to which they know about and utilize these services, which students are likely to engage with these resources, and what barriers prevent students from utilizing these services.

While this survey relies on a convenience sample of student respondents rather than a representative sample like the BPS: 12/14, this work nonetheless makes an important contribution. In particular, the survey administered at the U of A provides a much more detailed picture of students' usage of on-campus resources by asking students to report their usage multiple on-campus services rather than whether they use three broad categories of services, as in the BPS. Second, as a cross-sectional dataset, the U of A survey allows me to examine how upperclassmen interact with on-campus services rather than just first-year students as on the

BPS: 12/14. Finally, I include additional student characteristics, including personality traits, which allows me to develop a more nuanced description of which students utilize on-campus resources and how on-campus resources are related to students' sense of belonging.

A. Data

In order to obtain a more detailed understanding of which students utilize on-campus resources and whether resource utilization is correlated with measures of postsecondary success, I deployed a web-based survey at the University of Arkansas-Fayetteville during the fall of the 2018-19 school year. I advertised the survey to students through an on-campus daily electronic newsletter; additionally, individual professors agreed to send the survey directly to their class lists. The full survey instrument is available in Appendix B.

There are separate versions of the survey for freshmen and upperclassmen, each consisting of 70 items; estimated survey completion time is 15-20 minutes. On the survey, students report demographic information, including gender, race, parental education, Pell grant receipt, the Big Five personality traits, academic information (including merit scholarship receipt, current GPA, and high school GPA), and awareness and utilization of on-campus resources. The rich set of student characteristics allows me to examine in greater detail which students are likely to take advantage of available resources on campus as well as to better control for student characteristics when estimating the association between on-campus utilization and students' sense of campus belonging. In particular, I include personality measures on the U of A survey that are not available on the BPS: 12/14 survey. Psychologists generally regard personality as a semi-stable mix of behaviors, internal processes, and environmental conditions that influences an individual's habits, goals, and actions (Fajkowska, 2017). Personality can be measured in terms of broad traits, such as agreeableness, or narrow traits, such as locus of

control (Credé, Harms, Blacksmith, & Wood, 2016). The Big 5 factor theory of personality (Goldberg, 1993; McCrae & Costa, 1997) defines five broad personality traits: conscientiousness, extraversion, agreeableness, negative emotionality (or neuroticism), and open-mindedness. Researchers have linked these personality traits to a range of individual outcomes, including collegiate academic performance (Komarraju, Karau, Schmeck, & Avdic, 2011). I include the short form of the Big 5 Inventory (Soto & John, 2017) on the U of A survey. The short form of the inventory consists of 30 five-point Likert-type items. I score students' responses to these items following the recommendations laid out in Soto and John (2017).

In total, 446 individual students completed the survey; 289 (65.38%) were upperclassmen and 153 (34.62%) were freshmen. One student did not report their grade level and is excluded from the analysis; an additional observation is excluded because the student reported an implausible age. Of the 289 upperclassmen who began the survey, 235 (81.31%) completed enough items to be included in the analytic sample. Of the 153 freshmen who began the survey, 137 (89.54%) completed a sufficient number of items for the analysis. Table 6 describes the demographic characteristics of students who completed the survey.

As shown in Table 6, over half of the upperclassmen in the sample are women, as are over three-quarters of freshman survey respondents. Less than half of the students report graduating from high school in Arkansas. Both upperclassmen and freshmen report an average GPA of 3.7 on a four-point scale. About 53 percent of upperclassmen and 58 percent of freshman respondents have received or are currently receiving a merit-based scholarship. Both upperclassmen and freshmen respondents report having slightly better than a B average in their postsecondary courses. Around 25 percent of students are first-generation students. Students of color account for 19 percent of upperclassmen respondents, but only 15 percent of freshmen

respondents; conversely, Pell-eligible students are more highly represented among freshmen respondents.

Students in the U of A sample differ in important ways from the BPS: 12/14 sample used in the prior analysis. First, the U of A sample includes upperclassmen, while the BPS only includes students in their first year on campus. Second, all students at the U of A are enrolled at a four-year institution, while in the BPS:12/14 sample only about 65 percent of students are enrolled at a four-year institution. Next, less than 60 percent of students in the BPS: 12/14 sample are white, while 82 percent of students in the U of A sample identify as white. Almost 25 percent of U of A respondents are first-generation college students, compared to only 15 percent of BPS: 12/14 respondents. Additionally, the share of female respondents is larger in the U of A sample than in the BPS: 12/14 survey; 63 percent of U of A respondents are women, while 55 percent of BPS: 12/14 respondents are women. The age of respondents varies more in the BPS: 12/14 sample than in the U of A sample; students in the BPS sample report ages of 15-75, while respondents in the U of A sample report ages of 18-45. Academically, the two samples are similar; respondents at the U of A report about a B average in high school and respondents in the BPS sample report an AB[29] average in high school. In both samples, the average student would not expect to receive a Pell grant.

Students report their use of, or knowledge and intentions of use, of 17 different on-campus resources: academic advising, the Career Development Center, the Center for Educational Access, the Center for Learning and Student Success, the Center for Multicultural and Diversity Education, CLASS + Writing Support, the Spring International Language Center, Counseling and Psychological Services, financial aid advising, the Full Circle food pantry, the

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[29] The BPS: 12/14 survey reports high school GPA on a 7-point scale: A, AB, B, BC, C, D, and F. The survey at the U of A asked students report their high school GPA on a 4-point scale: A, B, C, D, and F.

Math Resource and Tutoring Center, the Pat Walker Health Center, professors' office hours, teaching assistants' office hours, Student Support Services, mentoring with a staff mentor, and mentoring with a student mentor. For each service, upperclassmen report their usage in the past academic year on a four-point scale: never, rarely (1-2 times), frequently (3-6 times), or often (weekly +). Similarly, freshmen report their intended usage on a five-point scale: never heard of, definitely will not use, probably will not use, probably will use, or definitely will use. Histograms of upperclassmen and freshmen students' responses for each service are presented in Appendix C. I exclude academic advising from the following analyses because students are required to go to academic advising in their freshman year, and the majority of upperclassmen (94%) report having used academic advising at least once in the prior year as well; this lack of variation makes it difficult to include advising in the models.

With this understanding of my sample, I turn now to my analytic strategy for examining students' responses to the survey.

B. Analytic Strategy

As with my analysis of the BPS: 12/14, my goal is to provide a descriptive overview of which students utilize on-campus services and whether service utilization is associated with postsecondary outcomes. The campus survey asks students about their use or knowledge of a comprehensive list of on-campus resources, which I collapse into four categories. Specifically, I ask about academic resources such as tutoring or attending office hours, wellness resources such as mental health services or an on-campus food pantry, multidimensional services such as the multicultural center or mentoring programs, and future planning services such as financial aid advising and the Career Development Center. Academic services provide a straightforward, well-defined resource for students: help explaining math concepts, providing feedback on written

work, and so on. Wellness services also provide a well-defined resource for students: physical or mental health care. Multidimensional services are less straightforward: students may receive academic support, but they are also given space to explore their identities, develop lasting relationships, and fulfill other socioemotional needs. Finally, future planning resources help students understand and plan for future challenges and opportunities. I group the services into these four categories for the sake of brevity and ease of interpretation.[30]

I run each model described below separately for upperclassmen and freshmen respondents. While upperclassmen report whether or not they actually used a particular resource in the prior academic year, freshmen indicate if they know about each resource and their intended likelihood of usage. Splitting the sample allows me to see which students are likely to know about the services and which are likely to use them as well as if there are certain groups who, while knowing about the existence of these services, are unlikely to use them. Such a pattern would indicate that the barriers to resource utilization are not due to a lack of information or advertising but are instead due to some other factor.

Less than 10 percent of respondents report never using or having no intentions of using any on-campus resources. The share of non-users is similar to the less than 11 percent of respondents in the BPS: 12/14 who report using no services. Unlike the BPS: 12/14 data, I have detailed information about students' frequency of use of each on-campus service. I therefore model the likelihood that a student will be a frequent user of on-campus services rather than predicting whether a student ever uses on-campus resources to extend my findings from the BPS: 12/14. I code upperclassmen as frequent users if they report using any particular service frequently (three to six times a year) or often (weekly + in the last academic year). I code

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[30] Results for individual services are available upon request.

freshmen as frequent users if they state they 'definitely will use' any particular service. I split

students' responses in this way based on the frequency of responses in each category, as shown

in the histograms presented in Appendix C. Freshman respondents appear to be more optimistic

about their intended usage than upperclassmen, making it necessary to split the responses

differently across the two groups. I predict the likelihood that a student will be a frequent user as

a function of student characteristics, including demographics, prior achievement, and

socioeconomic status. Specifically, I run the following discrete choice Probit model:

$$(4) \qquad P(y = 1|x) = \Phi(\beta_0 + \boldsymbol{\gamma demos_i} + \boldsymbol{\delta big5_i} + \varepsilon_i).$$

Students' personality traits are measured using the Big Five Inventory short form (Soto & John,

2017).[31] I standardize students' score for each trait for ease of interpretation. Additionally, I

include student gender, race, age, high school GPA (to account for prior achievement), Pell grant

eligibility (to account for socioeconomic background), and an indicator for whether the student is

employed, represented by the vector $\boldsymbol{demos_i}$.[32]

We can think of service usage as consisting of two dimensions. First, students can use

services to meet a variety of their needs, which may be thought of as breadth of service coverage.

Second, students can use a service multiple times, which may be thought of as depth of service

coverage. By predicting whether students will be frequent users of any service, I am examining

the depth of service. To examine breadth of service, I conduct an ordered Probit to predict

whether students will use zero services, services in one sector of campus life (academic,

wellness, multidimensional, or planning), services in two sectors (any combination of academic,

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[31] Alphas for each trait from 0.68 (open-mindedness) to 0.82 (negative emotionality).
[32] Students also report their majors; however, because respondents are from various disciplinary backgrounds there are not enough students in each major to include indicators for each reported major, but combining students into broader disciplinary categories introduces additional noise into the model without contributing significant explanatory power. I therefore do not include controls for students' areas of study.

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wellness, multidimensional, or planning), or services in three or more sectors. This model can be expressed as:

$$(5) \qquad P(y_i = j) = \Phi(\tau_j - x_i'\beta)(\tau_j - \boldsymbol{x_i'\beta}) - \Phi(\tau_{j-1} - x_i'\beta\boldsymbol{x_i'\beta}),$$

$$Y_i = j \leftrightarrow \tau^{j-1} < Y_i^* \leq \tau^j; j = 1, \dots, m$$

$$\tau^0 = -\infty, \tau^m = \infty$$

The vector of explanatory variables, x_i', includes student gender, race, high school GPA, merit scholarship receipt, employment status, Pell eligibility, first generation status, and the Big 5 personality traits.

Finally, I am interested in the ways in which utilizing support services shapes students' collegiate experiences. The survey includes three questions that help describe students' experiences on-campus and affinity to the campus. First, I ask students where they study: at home, in a campus library, in a public space on campus, in a public off-campus space, in an on-campus resource space, or in some other space. Second, I ask students to whom they would turn if they have a question or challenge relating to academics: figure it out on their own, ask a friend, ask an experienced peer, ask a professional (university faculty/staff), or ask a family member. Third, I ask students where they met their closest circle of friends: if they knew them before they arrived on campus or if they met them through Greek life, at their dorm, through a registered student organization, or through on-campus support services. Each item captures a different dimension of students' sense of belonging on campus, and begins to suggest how these services can affect students' experiences (Milem & Berger, 1997; Astin, 1999; Pascarella & Terenzini, 1980). These items are more specific than the measure of belongingness included on the BPS: 12/14, which simply asked students to report the extent to which they felt a part of their institution. By examining specific behaviors related to whether or not students feel a strong sense

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of belonging to the University of Arkansas-Fayetteville, we can gain greater insight into the relationship between use of on-campus resources and students' sense of belonging.

I code students' responses to each item as indicating a sense of affinity to the university or not. For the item asking students where they study, students are coded as feeling a sense of belonging if they report their study spot to be somewhere on campus, whether a public campus space, a campus library, or a resource space. Students are coded as not feeling a sense of belonging if they report studying at home or elsewhere off-campus. Students are coded as feeling a sense of belonging if they seek academic advice from a friend, experienced peer, or professional, and not if they seek academic advice from a family member or if they figure it out on their own. Finally, students are coded as feeling a sense of belonging if they state they made their close friends through an on-campus activity, whether Greek life, in their dorm, through a registered student organization, or through a support service. Students are coded as not feeling a sense of belonging if they state they knew all of their close friends prior to entering the university.

I estimate the likelihood a student will report a sense of belonging in each of these three areas of campus life using discrete choice Probit models. Specifically, I model belonging as a function of whether or not a student is a frequent user of on-campus support services, gender, age, race, high school GPA, Pell eligibility, first generation status, merit scholarship receipt, employment status, and personality. This model can be expressed as:

$$(6) \quad P(y = 1|x) = \Phi(\beta_0 + \beta_1 frequentuser_i + \boldsymbol{\gamma stuchars_i} + \varepsilon_i).$$

As before, I run this model separately for freshmen and upperclassmen. With this overview of my analytic strategy in mind, I turn now to the results of my analysis of the student survey administered at the U of A.

C. Results

I begin by presenting the results of my analysis predicting frequent usage of any on-campus service(s) at the U of A.

1) Predictors of Frequent Use of On-Campus Supports

Table 7 presents the marginal effects of a Probit model predicting frequent usage (Equation 4). Overall, both upperclassman and freshman respondents report high rates of frequent usage of on-campus resources; 60 percent of upperclassmen and 76 percent of freshmen are frequent users, even after excluding academic advising from the analysis. Perhaps as a result of this limited variation, there are few significant differences in frequent usage in this sample, as shown in Table 7. Column 1 presents results for upperclassman students. Among upperclassmen, more extraverted students are more likely to be frequent users of on-campus services; specifically, a one standard deviation increase in extraversion is associated with a 10.1 percentage point increase in the likelihood of frequent service usage. Extraverted students report being outgoing, dominant, and full of energy. Additionally, a one standard deviation increase in agreeableness is associated with a 7.3 percentage point increase in the likelihood of frequent service usage. Agreeable students report being compassionate, respectful, and assuming the best about people. No other characteristics are significant predictors of frequent usage of on-campus services among upperclassmen.

Column 2 presents results for freshman students. Female freshman students are almost 14 percentage points more likely to be frequent users of on-campus services than are male freshmen; this is larger than the finding from the BPS: 12/14 that first-year female students are 4.4 percentage points more likely than first year male students to use any on-campus service. Older students are also more likely to be frequent users of services. Pell-eligible students are

19.4 percentage points less likely to be frequent users of on-campus resources. The differences in likelihood of frequent usage by personality traits observed for upperclassmen are not observed among freshmen; neither extraversion nor agreeableness predicts frequent usage among freshmen. However, we do see that freshman students with higher scores of negative emotionality, also referred to as neuroticism, are more likely to be frequent users of on-campus resources, as are freshman students with higher scores on the open-mindedness scale. Students with higher scores of negative emotionality report being anxious and temperamental. Students with higher scores of open-mindedness report being original and are fascinated by art, music, or literature.

Overall, in this sample there are few differences in frequent service usage based on observed student characteristics. This pattern could indicate that the university's efforts to invest more heavily in student services are succeeding in making on-campus resources more widely known and accessible to students. However, the differences in results between the BPS: 12/14 and the on-campus survey could also be driven by differences in sampling procedures. The BPS: 12/14 is a large survey with a high response rate and clear stratification procedures to ensure its representativeness. The U of A survey is a convenience sample consisting of students who agreed to participate in a survey when asked through a campus-wide newsletter or class emails sent by a professor. Survey respondents may be more likely to use on-campus resources than the average student on campus, potentially masking differences by student characteristics. With this caveat in mind, I turn now to the results of my analysis examining the extent to which students utilize services across sectors at the University of Arkansas.

2) Predictors of Breadth of On-Campus Service Utilization

Table 8 presents the marginal effects of the ordered Probit predicting the likelihood that students would use no services, services in one sector, services in two sectors, or services in three or more sectors.

Table 8 presents the results of the ordered Probit among upperclassmen. There are few consistent patterns in terms of the likelihood a student will use services across a successively greater number of sectors, potentially because of the small sample size. Additionally, while these results may suggest patterns in the extent to which students utilize on-campus resources, they do not show the optimal level of service coverage for student success; in short, there is not a clear optimal level of service coverage. Female upperclassmen are 14.4 percentage points less likely than male upperclassmen to report using services in three or more sectors, and are 6.2 percentage points more likely than male students to use no on-campus resources. This pattern is opposite from that found in the BPS:12/14, which only examined whether students used any on-campus resources rather than service utilization in multiple sectors; the BPS also only focused on first year students, while this sample is comprised only of upperclassmen. Older students are less likely to use services in three or more sectors. Students of color are 8.1 percentage points less likely than white students to report using no services and are 18.6 percentage points more likely than white students to use services in three or more sectors. Students who are employed are 11.4 percentage points more likely to use services in three or more sectors than are students who are not working. Students scoring higher on the extraversion and agreeableness scales are significantly more likely to use services in three or more sectors. I observe no differences in the likelihood of service utilization based on prior achievement, Pell eligibility status, first generation status, conscientiousness, negative emotionality, or open-mindedness.

Table 9 shows the results of the ordered Probit for freshman respondents. There are few significant differences in service usage across student characteristics. I observe no differences in breadth of service usage by gender, age, Pell eligibility, first generation status, merit scholarship receipt, employment, extraversion, or agreeableness. Additionally, there is limited evidence of monotonic patterns of increasing utilization of services across sectors. Students who are higher achieving in high school, measured by their high school GPA, are more likely to report using no services or services in two sectors, but significantly less likely to use services in three or more sectors. Students of color are significantly less likely than their white peers to not intend to utilize on-campus services and to report intending to use services in only two sectors. Conversely, students of color are significantly more likely to report intending to use services in three or more sectors. Students with higher scores on the negative emotionality scale are less likely to report intending to use services in only two sectors but are more likely to intend to use services in three or more sectors. Finally, students with higher scores on the open-mindedness scale are more likely to report intending to use services in two sectors but are less likely to report intending to use services in three or more sectors.

With this understanding which students are utilizing on-campus resources, and how, I turn now to examining the relationship between on-campus service utilization and sense of belonging at the University of Arkansas.

3) On-Campus Service Utilization and Sense of Belonging

Table 10 presents the results of binary choice Probit models used to examine the association between whether upperclassmen are frequent users of on-campus services and their sense of belonging at the University of Arkansas. Upperclassmen who are frequent users of on-campus support services are more likely to demonstrate a sense of belonging with the university

through their choice of study location; this is encouraging given Astin's (1999) finding that students who spend more time on campus are more likely to persist in their studies. Specifically, upperclassmen frequent users are 20.3 percentage points more likely to study on-campus than are upperclassmen non-frequent users. However, there are no differences between frequent users and non-frequent users in terms of whom they go to for academic advice or where they make their closest friends, which Milem and Berger (1997), Pascarella and Terenzini (1980), and Astin (1999) indicate are measures of social integration. There are some differences by personality type. Students who score one standard deviation higher on the extraversion scale are 5.2 percentage points less likely to study on campus but are 6.9 percentage points to ask someone connected to the university for academic advice. Students who score one standard deviation higher on the open mindedness scale are 6.2 percentage points less likely to study on campus and are 5.4 percentage points less likely to make their close friends on campus. Working students are less likely to study on campus and are less likely to make their close friends on campus. Female students are more likely to make their close friends on campus than are male students, while older students and Pell eligible students are less likely to make their close friends on campus.

Table 11 presents the results of the analysis examining the relationship between frequent usage of on-campus services and sense of belonging for freshman students. Frequent usage of on-campus services is related to first year students' sense of belonging in terms of where they study and where they make their close friends, but not whom they ask for academic advice. Freshmen frequent users are 35.5 percentage points more likely to study on campus and 28.4 percentage points more likely to make their close friends on campus than non-frequent users. Older students are less likely to study on campus, but are more likely to ask someone on-campus

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for academic advice. Students with higher high school GPAs are more likely to seek academic advice on campus, while students of color are less likely to seek academic advice on campus.

Similar to the results from the BPS: 12/14, students who utilize on-campus resources frequently at the U of A express a greater affinity for the university than those who do not. This association may be larger for freshmen than for upperclassmen. Beyond service utilization, few observable student characteristics significantly predict belongingness.

The survey at the University of Arkansas in part replicates the results from the BPS: 12/14. For instance, both surveys find that female freshman students are more likely to utilize on-campus resources than male freshman students, and that wealthier students are more likely to use on-campus services. Additionally, in the BPS: 12/14 sample, first generation students are less likely to use both academic advising and career services; in the U of A sample, first generation students are also estimated to be less likely to be frequent users of on-campus resources, although the difference is not statistically significant.

There are also contrasts between the results from the two surveys. While the BPS: 12/14 survey indicates students of color may be more likely to use on-campus resources than white students, there are no differences in usage by race at the U of A. Similarly, in the BPS: 12/14 survey I find that students with higher GPAs in high school are more likely to use on-campus resources, while there are no differences in usage by prior achievement at the U of A. These differences could be due to differences in sample composition. For example, the share of white students in the U of A sample is greater than the share of white students in the BPS: 12/14 sample. The differences could also arise because of differences in statistical precision; fewer than 500 students responded to the U of A campus survey, while over 14,000 students are included in my analysis of the BPS: 12/14. Finally, it could be that the U of A is particularly effective at

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making on-campus resources available to students with lower prior achievement, for example. Future work should compare practices across campuses to examine how services are marketed to students, how students' perceptions of the accessibility of different services vary across groups, and whether certain types of services are particularly helpful for different groups of students.

The survey at the U of A extends the BPS: 12/14 by asking detailed questions about which services students utilize and by including measures of students' personality traits. While there are few consistent differences by personality, I find suggestive evidence that upperclassmen who score higher on measures of extraversion are more likely to be frequent users of on-campus resources, are more likely to use on-campus resources in three or more sectors of campus life, and are more likely to seek academic advice from others on campus. Among freshmen, students with higher scores on the negative emotionality scale are more likely to utilize academic services and are more likely to use on-campus resources in three or more sectors of campus life. Future work should continue to examine the relationship between personality and the transition to college life, including how to make on-campus resources accessible and helpful for students with different personality types and predispositions to seeking out resources.

The on-campus survey allows me to examine in greater detail which services students utilize, how frequently, and whether there are differences across student groups in how likely students are to utilize these resources. While informative, this survey raises additional questions. For instance, 93 percent of freshmen report that they intend to use academic-focused support services, while only 81 percent of upperclassmen report frequent usage of academic-focused services. Similarly, over 80 percent of freshmen intend to use wellness-focused services, while only 57 percent of upperclassmen report doing so; 66 percent of freshmen intend to use multidimensional services, compared to 34 percent of upperclassmen who actually do so.

Finally, 77 percent of freshmen intend to use planning services, while 47 percent of upperclassmen do so. These simple differences suggest there are barriers that prevent students from utilizing on-campus resources, despite their intentions. Further, while I observe a positive association between students' utilization of on-campus resources and a sense of belonging in both the BPS and U of A samples, I do not know if using these services helps students build a network, or whether more connected students are more likely to use these services. I also do not know the mechanism underlying the positive relationship I observe between service utilization and second-year persistence. To explore these questions in greater depth, I conduct a series of interviews with current undergraduate students at the University of Arkansas, as I discuss in the next section.

V.   **Student Interviews at the University of Arkansas**

The analyses presented thus far in this paper sketch an outline of which students are currently using on-campus resources as well how those services may affect students' collegiate experiences by examining the relationship between resource utilization and students' sense of belonging on campus. However, these surveys do not allow me to fully understand how students learn about, access, and experience support services. In order to gain this nuanced, detailed perspective on students' experiences, I conduct a series of interviews on the University of Arkansas campus in the fall of the 2018-19 school year. Three students, two of whom are sophomores and one of whom is a freshman, agreed to talk with me about their experiences using on-campus resources. Each has a different major; one is majoring in history intending to enter education, one is majoring in international business, and one is majoring in agriculture. Two interviewees are women, while one is a man; all identify as white. All students have at least

one parent with a higher education credential, ranging from an associate's degree to a graduate degree.

I met with each student on campus, in a private room at the student union, an accessible and familiar place. Interviews lasted between 15 and 30 minutes each. The interviews were semi-structured; I had a pre-established list of questions, but allowed the conversation to flow naturally and for new topics of interest to arise organically. I recorded and transcribed each interview. I then reviewed and coded the transcripts across interviewees to compare and contrast students' experiences with on-campus resources. In the discussion that follows, all names have been changed.

Students reported using a variety of on-campus resources, including the Center for Multicultural and Diversity Education (MC), Counseling and Psychological Services (CAPS), the Center for Learning and Student Success + Writing Support, the Math Resource and Tutoring Center, academic advising, the communications lab, financial aid advising, and the Pat Walker Health Center. While we initially discussed all of the services students had utilized, we then narrowed our conversation to discuss the resource that each student felt had had the largest impact on their experience at the university. For this more focused discussion, Adam, the male freshman, highlighted his experiences with the math tutoring center on campus; Sarah, a female sophomore, focused on her experiences with academic advising and with the multicultural center; and Megan, a female sophomore, focused on her experiences with Counseling and Psychological Services (CAPS).

I first asked students how they had initially learned of the resource that had altered their trajectory the most at the university. All three students underscored the importance of faculty members. Adam stated that his "math teacher … just kept telling us if we're struggling, go down

to the math lab, and they'll help us out, so that's what I did." Similarly, Adam learned about the

communications lab from a professor. He explained:

> there was an assignment that we had to do, uh, it was for my freshman business
> connections class, and they told us if we, we had to like write a paper, and they told us to
> go down to this lab and have them check it, there's like, there's a 95% chance that we'll
> pass.

For Adam, professors communicated information about on-campus resources to students as a

way to improve class performance. Adam trusted that if he followed his professors' advice, he

would succeed as a student.

Megan also learned about CAPS from a university instructor, but the resource was

marketed less as a means of improving grades and more as a general resource. Megan described

the process, stating:

> the instructor told us about it […] I think, especially at the University Perspective course
> they helped teach study habits and everything and told you about the CLASS+ center and
> all that and then if you're stressed, like how I was for missing friends and family and like
> not knowing anyone, you can go to CAPS.

Megan learned about CAPS, not through a professor specifically tying utilization of the resource

to success on an assignment, but instead in a general setting that informed her about the

existence of CAPS and its purpose. Megan was then able to utilize the service to meet her needs.

Again, there is an element of trust in Megan's experience; she viewed her University

Perspectives instructor as a legitimate source of information about campus resources, and

believed that CAPS would be helpful because of her instructor's recommendation.

Sarah also learned about a meaningful resource from her University Perspectives course,

specifically because of her instructor's connection to the Multicultural Center (MC). Sarah

explained:

The only reason I knew about it, is because, I forgot what her last name was … Kimberly was my, what was it called, like the orientation class you had to take as a freshman? … She was my teacher. And so she plugged it really hard.

Kimberly was a university administrator connected with the MC; were it not for the coincidence of having Kimberly as an instructor, Sarah believed she would not have known about the MC, which had positively shaped her first year on campus. Because of her role in the university beyond the University Perspectives course, Kimberly was an enthusiastic and effective ambassador for the resource. However, Sarah could not remember many other on-campus resources, stating "I don't think people know about some of these things cause like when you were [asking which services she had used], I was like, no idea." While each student initially learned of on-campus resources through a faculty or staff member, their motivations for utilizing the resources differed. Adam went to ensure he would earn high grades; Megan went to deal with general anxiety relating to her transition to college; and Sarah went because her instructor had been so consistent about recommending it.

Students also mentioned the importance of resident assistants (RAs) for learning about on-campus resources, although their experiences varied in terms of how effective RAs were at conveying information about on-campus resources. Megan felt that the university did "offer a lot of support, most—more than most places would" and that the university did a good job of communicating the availability of supports to students. In her experience, "the University Perspectives course was really helpful and the RAs are always really great." Sarah also discussed the importance of RAs, less for informing students about specific resources and more for creating a welcoming environment. Sarah described her experience as:

I think my RA did like a great job … I lived in [freshman dorm] and there's always something happening at [freshman dorm] and always at different times … things going on really made me feel like yeah, I really like [freshman dorm], and I still think [freshman dorm's] the best dorm. … if the alternative is I can stay in my room and watch

YouTube or I can go downstairs and like meet people that makes me feel more connected to campus.

For Sarah, her RA's personal attention to residents, even once bringing a home-cooked meal for the floor, made her feel connected and allowed her to meet new people. While Sarah did not recall learning of any specific resources from her RA, her experiences in the dorms helped her feel connected and socially successful during her first year on campus.

Adam also recognized RAs as an important source of information about specific on-campus resources, but was less convinced than Megan about their efficacy in doing so. Adam discussed the emphasis his dorm placed on formal events rather than direct communication about resources:

> I'm in [a learning community] so we get told about a lot of resources there. But it's not like, like there's no posters or anything or there's no bulletin board we have, um, where different resources are posted…. They've had different events where I've learned about stuff, like I didn't know about CAPS until like our dorm had some special event and they said you'll get free pizza if you come … some of the events we've had my RA has been like hey, go to this event, go to this event. Like one, one thing there's, we had, there's like something where we can watch free movies, it's like Netflix but it's for like older movies and stuff …. And there was an event to show us how to access that and my, well it wasn't my RA, but one of the RAs in the dorm told me hey, go to this and learn about it. And it was pretty late at night so like I don't want to go to that … So I didn't go and like she wouldn't tell me for like a week because I didn't go the event.

Adam felt that his RAs had knowledge of on-campus resources, whether academically-focused or resources available in the dorms, but that they would withhold that information unless residents attended special events specifically to learn about the resources.

The three students interviewed identified faculty, staff, and RAs as potentially important sources of information about on-campus resources. However, each student's experiences showed how the ways in which students learn about these resources can be highly variable depending on which professors or RAs students happen to have. While the University does have a formal class designed to help students transition successfully to college life, for only one student did this

course function as intended: to provide students an overview of available resources and to develop helpful skills. While Sarah did learn about the MC through the University Perspectives course, it was only because her instructor was an uncommonly enthusiastic promoter of the resource because of her administrative role at the university. Sarah could not identify any other resource she learned of through this course, and Adam did not mention the course at all. Adam and Sarah both mentioned the importance of professors for advertising specific resources and events; for Adam, his math and business professors introduced him to the math tutoring center and the communications lab, respectively. For Sarah, her history professors were important sources of information about history lectures and other departmental events that allowed her to explore her interests. In order for students to access and benefit from on-campus resources, they have to know about their existence. While these three students had all learned about different on-campus resources, their divergent experiences suggest that a systematic approach to informing students of all the resources available to them on campus does not yet exist.

After learning about the existence of on-campus resources, students may face additional challenges in actually accessing and utilizing these resources. I asked each student about the different challenges they faced in accessing on-campus resources. Both Adam and Sarah discussed logistical issues they had faced when trying to use different resources on campus. For example, Adam described his experience trying to get help with his writing, "I tried to schedule an appointment [with the writing lab] um but like there were just no appointments open and … it didn't even show me … a later date when I could schedule one." Adam and Sarah are both high achieving students, reporting college GPAs of 3.5 and 3.9, respectively, and likely plan further in advance than do most students. However, the delay of a week or more between scheduling an appointment with an advisor and meeting with that advisor, or not being able to get an

appointment at the writing center within a week, presented a real obstacle to utilizing resources on-campus. Sarah sought advice from other students and an online course planning tool when she could not schedule an appointment with an advisor, while Adam chose not to use the writing center at all.

Adam also discussed overcoming his own biases about tutoring in order to go to the math resource center for help. He explained:

> I didn't want to go there because I feel like, I don't know, like I should have just known it, but after I went there and then they explained to me all the stuff, then I would go back to my class and like nobody in my class, nobody knows how to do it, the hard stuff, except for me, because I'd go down there.

For Adam, going to tutoring was difficult because it meant admitting that he needed help; however, after he experienced the benefit of tutoring, he continued going back. Adam's math professor's repeated mentions of the tutoring center may have helped normalize going to the tutoring center, making it easier for Adam to first utilize the resource. Additionally, the tutoring center was logistically easy for Adam to access; he merely had to go to the tutoring center, put in a ticket explaining what he needed help with, and then wait at a table until a tutor came over. However, Adam also noted that many students who could benefit were not utilizing the tutoring center: "I have like my class of like 70 people and probably maybe 25-30 of those people are using it and probably like 40 or 50 of those people need, need the help."

In addition to overcoming their own perceptions of seeking out on-campus services for help, students may also have to contend with other students' perceptions or negative experiences. For instance, at her freshman orientation, Sarah met with an academic advisor to sign up for courses and was ultimately enrolled in a course she had previously taken in high school and gotten college credit for. Sarah coped with this experience:

It's not that big of a deal, like I got a really good rec letter out of it … it was a fun experience, and it like it was a nice easy course, intro to college, but like, I have had some friends who were a little soured off of [advising] because of similar things.

For Sarah, the benefit of building a relationship with a professor and having fun compensated for the hassle of being directed to take a course she did not need for graduation. However, for other students, such an experience can destroy their trust in a particular service, limiting that service's ability to help other students as well. Both Sarah and Megan described how students share information with each other, either encouraging or discouraging students to seek out certain on-campus resources. For instance, Megan recounted how, "if you hear one person who doesn't like something they tell—they tell everyone it's the worst thing ever… and I think it keeps people from wanting to go there." Just as students learn about the existence of on-campus resources from faculty and RAs, they learn about the quality of services from other students, and these recommendations can have a substantial impact on students' decisions of whether or not to seek out certain resources.

After students have learned about on-campus services and overcome any barriers to accessing these resources, how does interacting with these resources affect their collegiate experiences? I discussed this question with the three students interviewed in this project. Megan talked about how going to CAPS helped her transition to college and make friends:

My first semester at the school was really hard. Cause I didn't really know anyone and I didn't really know how to approach college… I was just pretty sad. … so I went to CAPS and they like started to tell me how to get involved in stuff so [I] went online to start looking at the RSOs and club sports and everything and found Quidditch … that's where all of my friends are.

Megan was struggling to adjust to campus life when she first arrived. She was one of the only students from her public school district to attend the U of A, and arrived on campus without knowing anyone. She compared herself to other students in her dorm, who seemed to know their

roommates before arriving, and had already built support networks. She also struggled to adjust to the demands of her classes, saying:

> I think I was pretty cocky in high school. Just cause…but also like, now I'm like, oh I wasn't smarter than anyone, there was just only a few people who actually tried in high school. And now I'm here and I'm like, I'm doing pretty good, I'm going to keep going with this. I'm not cocky anymore.

Working with CAPS helped Megan navigate the stresses of adjusting to a new social and academic environment.

Sarah discussed the importance of on-campus services for making the campus seem smaller and more welcoming. She contrasted her experience with her friends from high school currently attending a local community college, but thinking about transferring to the U of A:

> I have like one long-term friend that I've actually met [at the MC], but most of them are just like oh, like there's a friendly face on campus, I know them … and that's kind of nice even if I don't know them super well. … It's a big school and there's kind of an image at least at like NWACC of like people at U of A not being friendly.

For Sarah, finding community through the MC and in her dorm allowed her to feel personally connected to the university, despite its large size and various bureaucratic systems she had to navigate. Those personal connections shaped her experiences and allowed her to not only navigate her own college transition, but also to facilitate her boyfriend's and other transfer students' transitions to the main U of A campus.

All three students I interviewed had relatively positive experiences with on-campus services, even if they faced challenges in accessing certain resources. However, each also believed there were many students on campus who would benefit from on-campus services but were not utilizing them. For example, Adam mentioned his roommate, saying:

> I think he should go to CAPS and talk to somebody there … I don't want to be like hey go to CAPS cause I don't want to seem mean or anything. … So I wish he like would be more aware of what CAPS is so he would just go there himself.

I asked each student what they thought on-campus services could do to make students more aware of the resources offered on campus. Sarah spoke about the importance of making things personal and easy to fit into a busy schedule:

> Something I've noticed is sometimes I want to stay on campus longer but everything happens while I'm in class and then I work .…I know it's like individual groups and clubs doing that, but like if there was more of an incentive to like hold your thing at 4 o'clock or hold your thing at— so there were more things happening not just in the middle [of the day].

For Sarah, events organized by student organizations tend to cater to non-working students who live on campus and have flexible schedules during the day. In contrast, she lives off campus and works in Bentonville, giving her less time during the day to hang around on campus. Having opportunities to have fun and get to know other students casually is important to Sarah, and makes an otherwise impersonal campus feel personal and engaging. The survey results presented above indicate that, in general, upperclassmen who are employed are more likely to be frequent users of on-campus services and to use services in three or more sectors of campus life. However, the survey did not differentiate between students such as Sarah, who work off campus, and students who work on campus; Astin (1999) found that while students who work full-time off-campus were less likely to persist, students who work part-time on-campus were more likely to be retained. A similar pattern at the U of A could explain the difference between Sarah's experience and the experiences reported by the average upperclassmen respondent on the survey.

Both Adam and Sarah mentioned the need for more advertising of campus resources. Adam stated, "I feel like if they just had more posters out people would be able to see where they are. Because people probably know what it is but I don't think everyone knows where it is." For both Adam and Sarah, on-campus services could do more to advertise themselves and their sponsored events to students. Interestingly, while Adam talked about not having a bulletin board

or other permanent source of information of on-campus resources in his dorm, Sarah called out her dorm as a place where she received most of her support. While Megan acknowledged that CAPS was not as widely used as it potentially should be, she did acknowledge their efforts to reach students, saying, "I think their outreach programs are really good ideas … like the one with the dogs last year." Each year, during finals, CAPS brings emotional support dogs to public areas on campus to help students de-stress; to Megan, such a highly visible and fun event is a great way to attract students to the service.

Sarah, Megan, and Adam reported some similarities in their experiences with on-campus support services. For all three, professors and faculty were important sources of information about available resources; RAs were also seen as important information brokers on campus. Future work should examine the extent to which RAs and faculty feel prepared to inform students about the various resources available on campus, and how universities support faculty and student employees in this role.

After learning of available resources, students faced challenges in accessing those resources; these challenges included logistical hurdles, personal stigmas, and other students' opinions. Once they overcame these challenges, Sarah, Megan, and Adam were able to use on-campus resources to make close friends, to build a network of friendly faces to personalize the university, and to succeed academically. Their experiences show the importance of making sure all students have access to on-campus supports to promote students' success and suggest ways in which service centers can adjust their practices to better meet students' needs.

VI.   Conclusion

In this paper, I have examine student support services from three perspectives. First, my findings from the nationally representative Beginning Postsecondary Students Longitudinal

Study: 2012/14 show that over two-thirds of first-year students at two and four-year institutions use academic advising, and over half of first-year students report using financial aid advising. However, less than 40 percent of students use academic support services, and fewer than one in five use career services. Further, students from lower-income families, first-generation students, and previously lower-achieving students are less likely to utilize academic services than their peers, potentially exacerbating gaps in postsecondary completion. Utilization of student support services is positively related to second-year persistence and students' sense of belonging on campus, indicating these services are associated with students' long-term postsecondary success.

My second analysis focuses on a single university to replicate and extend my findings from the BPS: 12/14. In this survey, students report their usage patterns of a wider range of on-campus services and provide measures of additional student characteristics, such as personality, that are not available in the BPS. The University of Arkansas data includes 446 responses from students in all grade classifications. My results suggest that freshmen from lower-income families are less likely to be frequent users of on-campus resources, while upperclassmen who are employed and who score higher on scales of extraversion or agreeableness are more likely to be frequent users of on-campus resources. Additionally, upperclassmen who are employed, who score higher on scales of extraversion or agreeableness, and who identify as students of color are more likely to use services in three or more sectors of campus life. Among freshmen, students who report higher high school GPAs and who score higher on scales of agreeableness, open-mindedness, and negative emotionality are more likely to use services in three or more sectors of campus life. My analysis of the campus survey replicates my finding from the BPS that not all students utilize on-campus resources, and that these differences in resource utilization may be associated with measures of student advantage. As with the BPS, my analysis of the campus

survey indicates that students who frequently utilize on-campus resources feel a greater sense of belonging on campus than students who infrequently or never utilize on-campus resources.

Finally, I explore students' interactions with on-campus resources by interviewing three students at the University of Arkansas who describe how they learn about the availability of services, how accessible these services are in practice, and how utilizing these services shape their collegiate experience. These interviews highlight the importance of professors for informing students of available resources, the logistical, emotional, and social challenges students face in accessing support services, and the importance of support services for shaping students' collegiate experiences. Each student has his or her own experiences with on-campus resources, and for each, their interactions with on-campus services serve a different purpose. For one student, support services are a way to succeed academically, while another uses support services to manage her stress and adjust to the academic and social demands of campus. Finally, one student uses the relationships built through a support service to personalize the campus and facilitate others' transition to the university. All three interviewees emphasize the need to make these resources easily accessible, in terms of availability of information about services, limited delays between realizing a need for assistance and an appointment, and countering stigma surrounding certain services.

This paper suggests that student support services have the potential to fulfill their mission and help students succeed in their postsecondary education. However, there is also room for improvement. Students who may need the most support may be less likely to access these services, and students often face barriers when attempting to leverage these resources for their success. Universities should track which students are utilizing on-campus resources and evaluate how they can better connect students with relevant services. Additionally, the ways by which

students learn about on-campus resources is haphazard, with some students learning about resources in a university transition class, others hearing of resources in content classes, and still others learning of resources in their dorms. Future work should examine the process by which faculty members and other information brokers learn of on-campus services themselves, whether they see this type of information dissemination as part of their roles, and how their own experiences with different centers, services, and on-campus groups affect whether and how they communicate these opportunities to students.

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Table 1: Characteristics of BPS: 12/14 Sample

	Analytic Sample
Female	55.25%
First generation	14.63%
Race	
White	57.76%
Black	12.98%
Latino/a	17.82%
Asian	6.46%
American Indian/Alaskan Native	0.70%
Native Hawaiian/Pacific Islander	0.34%
Multiracial	3.94%
Institution Type	
Public 4-year	40.88%
Private nonprofit 4-year	21.73%
Private for-profit 4-year	2.49%
Public 2-year	31.70%
Private nonprofit 2-year	0.58%
Private for-profit 2-year	2.61%
N	*14,480*

Descriptive statistics calculated using recommended survey weights and bootstrap procedures
Number of observations rounded

Table 2: Additional Sample Characteristics of BPS: 12/14

	Range	**Mean (Std. Err.)**
Age at first survey	15-75	18.74 (0.03)
Expected Family Contribution	0-$133,395	$12,677.04 (285.70)
High School GPA	1-7	5.73 (0.02)
Combined SAT Score^		1018.67 (2.77)
Distance from first institution	1-8,978	148.15 miles (5.51)
N		*14,480*

Standard errors calculated using student-level weights and bootstrapping variance estimation
^SAT score is derived from students' reported ACT score if a direct SAT score is not available
Number of observations rounded

175

Table 3: Predictors of On-Campus Service Utilization

	(1) Academic Advising	(2) Academic Support	(3) Career Services	(4) Fin Aid Services	(5) No Services
Age	-0.006***	0.004*	-0.002	-0.004	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Black	-0.012	0.073***	0.058***	0.056***	-0.015**
	(0.011)	(0.012)	(0.011)	(0.012)	(0.008)
Latino/a	0.008	0.059***	0.053***	0.055***	-0.022***
	(0.011)	(0.012)	(0.010)	(0.012)	(0.007)
Asian	0.006	0.096***	0.057***	0.045***	-0.032***
	(0.017)	(0.018)	(0.015)	(0.017)	(0.011)
American Indian/Alaska Native	0.042	0.010	-0.003	0.004	-0.009
	(0.038)	(0.042)	(0.034)	(0.043)	(0.027)
Native Hawaiian/Pacific Islander	0.076*	0.150***	0.136***	0.117**	-0.054**
	(0.046)	(0.057)	(0.052)	(0.051)	(0.025)
More than one race	-0.010	0.045**	0.007	0.046**	0.004
	(0.019)	(0.020)	(0.016)	(0.020)	(0.014)
EFC ($1000s)	0.001**	0.000*	-0.000	-0.005***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.060***	0.053***	0.004	0.030***	-0.044***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)
High school GPA	0.016***	0.008**	0.016***	-0.003	-0.005**
	(0.003)	(0.004)	(0.003)	(0.004)	(0.002)
Composite SAT (100s)	0.015***	-0.006***	0.007***	-0.006***	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Distance (10s)	0.000**	0.000**	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
First generation	-0.028***	0.005	-0.015*	0.031***	-0.000
	(0.010)	(0.011)	(0.009)	(0.011)	(0.007)
Observations	14,480	14,480	14,480	14,480	14,390

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Standard errors calculated using 200 bootstrap replications
Recommended sample weights used in all models
State and institution sector fixed effects not shown
Number of observations rounded
EFC- Expected Family Contribution; GPA- Grade Point Average

Table 4: On-Campus Service Utilization and Second Year Persistence

	(1)	(2)
Academic advising	**0.029****	
	(0.014)	
Academic support services	**0.030***	
	(0.017)	
Career services	**0.037****	
	(0.015)	
Financial aid services	**-0.002**	
	(0.015)	
No services used		**-0.037***
		(0.020)
Age	-0.022***	-0.022***
	(0.004)	(0.004)
Black	-0.058***	-0.055***
	(0.019)	(0.020)
Latino/a	-0.005	-0.003
	(0.017)	(0.017)
Asian	0.034	0.038
	(0.025)	(0.025)
American Indian or Alaska Native	-0.009	-0.008
	(0.070)	(0.072)
Native Hawaiian/other Pacific Islander	-0.024	-0.020
	(0.089)	(0.089)
More than one race	-0.035	-0.036
	(0.032)	(0.032)
Expected family contribution ($1000s)	0.002***	0.002***
	(0.000)	(0.000)
Female	0.044***	0.045***
	(0.012)	(0.012)
High school GPA	0.019***	0.020***
	(0.005)	(0.005)
SAT derived composite score (100s)	0.017***	0.017***
	(0.003)	(0.003)
Distance (10s miles)	-0.000	0.000
	(0.000)	(0.000)
First generation	-0.053***	-0.054***
	(0.015)	(0.015)
Observations	14,480	14,480

*** p<0.01, ** p<0.05, * p<0.1
Standard errors calculated using 200 bootstrap replications
Recommended survey weights included in all models
State and institution sector fixed effects not shown
Number of observations rounded

Table 5: On-Campus Service Utilization and Sense of Belonging

	(1)	(2)
Academic advising	**0.023***	
	(0.014)	
Academic support services	**0.023***	
	(0.012)	
Career services	**0.069*****	
	(0.015)	
Financial aid services	**0.028***	
	(0.014)	
No services used		**-0.055****
		(0.023)
Age	0.012**	0.012**
	(0.006)	(0.006)
Black	-0.010	-0.003
	(0.021)	(0.022)
Latino/a	-0.035*	-0.031
	(0.020)	(0.020)
Asian	-0.006	0.002
	(0.030)	(0.030)
American Indian or Alaska Native	0.205***	0.208***
	(0.069)	(0.069)
Native Hawaiian/other Pacific Islander	0.031	0.042
	(0.106)	(0.108)
More than one race	0.046	0.048
	(0.034)	(0.034)
Expected Family Contribution ($1000s)	0.002***	0.001***
	(0.000)	(0.000)
Female	0.016	0.017
	(0.015)	(0.015)
High school GPA	0.023***	0.024***
	(0.007)	(0.007)
SAT derived composite score (100s)	-0.012***	-0.012***
	(0.004)	(0.004)
Distance (10s)	0.000**	0.000***
	(0.000)	(0.000)
First generation	0.002	0.001
	(0.018)	(0.018)
Observations	14,910	14,910

*** p<0.01, ** p<0.05, * p<0.1
Standard errors calculated using 200 bootstrap replications
Recommended sample weights included in all models
State and institution sector fixed effects not shown
Number of observations rounded

Table 6: Characteristics of U of A Campus Support Services Survey

	Range	**Upperclassmen** Mean (Std. Error)	**Freshmen** Mean (Std. Error)
Current GPA	0-4	3.26 (0.61)	3.16 (1.19)
Age	18-45	20.62 (3.9)	18.49 (2.31)
High school GPA	2.3-4.9	3.67 (0.35)	3.72 (0.31)
Merit scholarship- never	0-1	46.88%	42.48%
Merit scholarship- in the past	0-1	10.07%	1.96%
Merit scholarship- current	0-1	43.06%	55.56%
Female	0-1	55.75%	76.32%
In-state student	0-1	38.06%	43.14%
Student of color	0-1	19.29%	14.86%
Pell eligible	0-1	17.65%	26.32%
First generation	0-1	23.26%	28.29%

Table 7: Predictors of Frequent Usage of On-Campus Services (Probit, Marginal Effects)

	(1) Upperclassmen	(2) Freshmen
Female	-0.016	0.139*
	(0.068)	(0.078)
Age	-0.011	0.137**
	(0.010)	(0.066)
High school GPA	0.021	-0.072
	(0.086)	(0.120)
Pell eligible	0.047	-0.194**
	(0.085)	(0.085)
Student of color	-0.019	-0.069
	(0.089)	(0.086)
First generation	-0.064	-0.045
	(0.077)	(0.080)
Merit scholarship	0.067	0.006
	(0.065)	(0.075)
Employed	0.125*	-0.052
	(0.065)	(0.077)
Extraversion	0.101***	0.061
	(0.032)	(0.039)
Agreeableness	0.073**	0.030
	(0.034)	(0.035)
Conscientiousness	-0.005	0.012
	(0.036)	(0.037)
Negative Emotionality	-0.007	0.064*
	(0.037)	(0.037)
Open Mindedness	0.004	0.114***
	(0.032)	(0.035)
Observations	235	137

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses
Personality traits standardized

Table 8: Breadth of Service Utilization, Upperclassmen

	No Services	One Sector	Two Sectors	3+ Sectors
Female	0.062**	0.066**	0.016	-0.144**
	(0.029)	(0.027)	(0.01)	(0.06)
Age	0.008***	0.008***	0.002	-0.018***
	(0.003)	(0.003)	(0.001)	(0.007)
High school GPA	-0.019	-0.021	-0.005	0.045
	(0.035)	(0.037)	(0.009)	(0.080)
Pell Eligible	-0.016	-0.017	-0.004	0.038
	(0.031)	(0.033)	(0.008)	(0.073)
Student of color	-0.081**	-0.085**	-0.02	0.186**
	(0.037)	(0.037)	(0.013)	(0.078)
First generation	0.025	0.026	0.006	-0.057
	(0.027)	(0.028)	(0.008)	(0.062)
Merit scholarship	-0.023	-0.024	-0.006	0.052
	(0.025)	(0.025)	(0.006)	(0.055)
Employed	-0.049**	-0.052**	-0.012	0.114**
	(0.024)	(0.026)	(0.009)	(0.055)
Extraversion	-0.034***	-0.036***	-0.009*	0.079***
	(0.012)	(0.013)	(0.005)	(0.026)
Agreeableness	-0.039**	-0.041***	-0.010*	0.090***
	(0.015)	(0.015)	(0.005)	(0.031)
Conscientiousness	0.02	0.021	0.005	-0.046
	(0.013)	(0.014)	(0.004)	(0.030)
Negative emotionality	0.009	0.009	0.002	-0.021
	(0.013)	(0.014)	(0.003)	(0.029)
Open mindedness	-0.004	-0.004	-0.001	0.009
	(0.011)	(0.011)	(0.003)	(0.025)
Cut 1	-1.961	-1.961	-1.961	-1.961
Cut 2	-1.11	-1.11	-1.11	-1.11
Cut 3	-0.220	-0.220	-0.220	-0.220
Pseudo R-squared	0.060	0.060	0.060	0.06
Observations	235	235	235	235

*$p<0.10$, **$p<0.005$, ***$p<0.001$*
Delta-method standard errors in parenthesis
Average marginal effects from ordered Probit presented

Table 9: Breadth of Service Utilization, Freshmen

	No Services	Services in One Sector	Services in Two Sectors	Services in Three+ Sectors
Female	0.006	0.004	0.008	-0.018
	(0.028)	(0.020)	(0.042)	(0.090
Age	-0.003	-0.002	-0.005	0.011
	(0.006)	(0.004)	(0.007)	(0.016)
High school GPA	0.075*	0.051	0.108*	-0.233*
	(0.041)	(0.034)	(0.059)	(0.121)
Pell Eligible	0.001	0.000	0.001	-0.002
	(0.028)	(0.019)	(0.040)	(0.087)
Student of color	-0.034	-0.023	-0.049	0.106
	(0.033)	(0.019)	(0.045)	(0.094)
First generation	0.033	0.022	0.048	-0.103
	(0.028)	(0.019)	(0.033)	(0.077)
Merit scholarship	-0.025	-0.017	-0.037	0.080
	(0.024)	(0.017)	(0.033)	(0.072)
Employed	0.010	0.007	0.014	-0.030
	(0.023)	(0.016)	(0.034)	(0.074)
Extraversion	-0.012	-0.008	-0.017	0.037
	(0.012)	(0.008)	(0.017)	(0.036)
Agreeableness	-0.021**	-0.014	-0.030**	0.065**
	(0.010)	(0.009)	(0.015)	(0.030)
Conscientiousness	-0.009	-0.006	-0.013	0.029
	(0.012)	(0.008)	(0.016)	(0.034)
Negative Emotionality	-0.036**	-0.025**	-0.053***	0.114***
	(0.018)	(0.012)	(0.017)	(0.039)
Open Mindedness	-0.021*	-0.014	-0.031*	0.066*
	(0.013)	(0.010)	(0.017)	(0.036)
Cut 1	-4.382	-4.382	-4.382	-4.382
Cut 2	-3.975	-3.975	-3.975	-3.975
Cut 3	-3.242	-3.242	-3.242	-3.242
Pseudo R-squared	0.113	0.113	0.113	0.113
Observations	137	137	137	137

*p<0.10, **p<0.005, ***p<0.001*
Delta-method standard errors in parenthesis
Average marginal effects from ordered Probit presented

Table 10: On-Campus Support Service Utilization and Sense of Belonging, Upperclassmen

	(1) Study Habits	(2) Academic Advice	(3) Making Friends
Frequent user	**0.203***	**0.033**	**0.035**
	(0.059)	**(0.061)**	**(0.052)**
Female	-0.057	0.086	0.132**
	(0.066)	(0.064)	(0.057)
Age	0.003	-0.008	-0.018**
	(0.012)	(0.009)	(0.009)
High school GPA	0.008	-0.044	0.011
	(0.095)	(0.080)	(0.067)
Pell eligible	-0.117	-0.005	-0.162***
	(0.082)	(0.077)	(0.057)
Student of color	0.089	-0.141*	0.042
	(0.082)	(0.074)	(0.072)
First generation	-0.108	0.010	-0.052
	(0.076)	(0.074)	(0.060)
Merit scholarship	0.020	-0.092	0.002
	(0.061)	(0.063)	(0.054)
Employed	-0.177***	0.034	-0.102**
	(0.059)	(0.064)	(0.051)
Extraversion	-0.052*	0.069**	0.028
	(0.032)	(0.032)	(0.025)
Agreeableness	0.043	0.041	0.010
	(0.035)	(0.032)	(0.031)
Conscientiousness	0.006	-0.026	0.008
	(0.035)	(0.035)	(0.031)
Negative emotionality	0.013	-0.013	-0.009
	(0.034)	(0.033)	(0.029)
Open mindedness	-0.062**	-0.036	-0.054**
	(0.030)	(0.030)	(0.026)
Pseudo R-squared	0.110	0.071	0.184
Observations	236	236	233

*** p<0.01, ** p<0.05, * p<0.1*
Robust standard errors in parentheses
Probit, marginal effects presented

Table 11: On-Campus Support Service Utilization and Sense of Belonging, Freshmen

	(1) Study Habits	(2) Academic Advice	(3) Making Friends
Frequent user	0.355***	-0.017	0.284***
	(0.102)	(0.096)	(0.084)
Female	-0.026	-0.154	-0.115
	(0.102)	(0.098)	(0.099)
Age	-0.025*	0.031*	-0.002
	(0.015)	(0.016)	(0.015)
High school GPA	-0.017	0.223*	0.105
	(0.146)	(0.132)	(0.130)
Pell Eligible	-0.125	0.097	0.009
	(0.108)	(0.104)	(0.108)
Student of color	0.019	-0.176*	-0.163
	(0.123)	(0.104)	(0.104)
First generation	-0.071	-0.088	-0.032
	(0.094)	(0.089)	(0.088)
Merit scholarship	-0.004	-0.125	-0.008
	(0.089)	(0.080)	(0.080)
Employed	0.146	0.122	0.086
	(0.099)	(0.101)	(0.099)
Extraversion	0.008	-0.048	-0.033
	(0.049)	(0.045)	(0.045)
Agreeableness	-0.033	0.039	-0.031
	(0.043)	(0.039)	(0.046)
Conscientiousness	0.066	0.021	0.031
	(0.046)	(0.045)	(0.044)
Negative emotionality	0.040	-0.027	-0.009
	(0.050)	(0.044)	(0.044)
Open mindedness	-0.026	-0.005	0.010
	(0.045)	(0.044)	(0.042)
Pseudo R-squared	0.106	0.106	0.092
Observations	136	135	136

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Robust standard errors in parentheses
Probit, marginal effects presented

Appendix A: Alternative Analysis of Belongingness in BPS: 12/14 Sample

Table A.1: On-Campus Service Utilization and Sense of Belonging (Standardized)

	(1)	(2)
Academic advising	**0.093***	
	(0.029)	
Academic support services	**0.064****	
	(0.025)	
Career services	**0.145***	
	(0.032)	
Financial aid services	**0.050***	
	(0.030)	
No services used		**-0.147***
		(0.047)
Age	0.011	0.011
	(0.011)	(0.011)
Black	-0.045	-0.032
	(0.047)	(0.048)
Latino/a	-0.030	-0.023
	(0.041)	(0.041)
Asian	0.022	0.038
	(0.071)	(0.071)
American Indian or Alaska Native	0.321***	0.323***
	(0.111)	(0.114)
Native Hawaiian/other Pacific Islander	-0.101	-0.082
	(0.214)	(0.221)
More than one race	0.011	0.012
	(0.070)	(0.069)
Expected Family Contribution ($1000s)	0.003***	0.003***
	(0.001)	(0.001)
Female	0.023	0.026
	(0.028)	(0.028)
High school GPA	0.050***	0.053***
	(0.014)	(0.014)
SAT derived composite score (100s)	-0.022***	-0.021***
	(0.007)	(0.007)
Distance (10s)	0.001*	0.001*
	(0.000)	(0.000)
First generation	-0.035	-0.035
	(0.040)	(0.039)
Observations	14,480	14,480
R-squared	0.051	0.045

*** p<0.01, ** p<0.05, * p<0.1

Standard errors calculated using 200 bootstrap replications

Recommended sample weights included in all models; state and institution sector fixed effects not shown

Number of observations rounded

Appendix B: Campus Survey for the University of Arkansas

Examining the Role of On-Campus Support Services—UA Student Survey

Academic Record

1. When did you first enroll at the University of Arkansas?
    a. Month:
    b. Year:
2. Had you ever enrolled full-time at another college before starting at the University of Arkansas?
    a. Yes
    b. No
3. How many college credits did you enter the University of Arkansas with? (e.g. from AP or IB classes, concurrent credit, or a prior college)
    a. 0 credits
    b. 1-8 credits
    c. 9-12 credits
    d. 13-22 credits
    e. 24+ credits
4. Which of the following best describes your current area of study? If you have declared a major, select that. If you have more than one major, please select your primary focus. If you are undecided, please select 'undecided' or choose the area that is most likely to become your declared major.

a. Agriculture
b. American Studies
c. Anthropology
d. Architecture
e. Art
f. Biology
g. Business Administration
h. Chemistry
i. Classical Studies
j. Communication
k. Computer Science
l. Criminology
m. Earth Science
n. Economics
o. Education
p. Engineering
q. English
r. Geography
s. Geology
t. Graphic Design
u. History

v. Human Environmental Science
w. Interior Design
x. International and Global Studies
y. International Business
z. Journalism
aa. Kinesiology
bb. Mathematics
cc. Music
dd. Nursing
ee. Philosophy
ff. Physics
gg. Political Science
hh. Psychology
ii. Public Health
jj. Social Work
kk. Sociology
ll. Theater
mm. Undecided
nn. World Language

5. Have you declared more than one major? (This does not include minors or certificates)
    a. Yes
    b. No
6. When do you expect to graduate from the University of Arkansas?
    a. Month:
    b. Year:
7. What is your current cumulative GPA at the University of Arkansas?
    a. GPA:

Big 5 Personality Traits

8. Please respond honestly to the following prompts, paying attention to the scale provided

	Disagree strongly	Disagree a little	Neutral; no opinion	Agree a little	Agree strongly
I am someone who…					
Tends to be quiet					
Is compassionate, has a soft heart					
Tends to be disorganized					
Worries a lot					
Is fascinated by art, music, or literature					
Is dominant, acts as a leader					
Is sometimes rude to others					
Has difficulty getting started on tasks					
Tends to feel depressed, blue					
Has little interest in abstract ideas					
Is full of energy					
Assumes the best about people					
Is reliable, can always be counted on					
Is emotionally stable, not easily upset					
Is original, comes up with new ideas					
Is outgoing, sociable					
Can be cold and uncaring					
Keeps things neat and tidy					
Is relaxed, handles stress well					
Has few artistic interests					
Prefers to have others take charge					
Is respectful, treats others with respect					
Is persistent, works until the task is finished					
Feels secure, comfortable with self					
Is complex, a deep thinker					
Is less active than other people					
Tends to find fault with others					
Can be somewhat careless					
Is temperamental, gets emotional easily					
Has little creativity					

Support Services Utilization

9. What is your current grade classification?
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
10. If upperclassman (not freshman), in the last academic year (2017-18), how many times did you use each of the following resources on campus?

	Never	Rarely (1-2 times)	Frequently (3-6 times)	Often (Weekly+)
Academic Advising				
Career Development Center				
Center for Education Access				
Center for Learning and Student Success				
Center for Multicultural and Diversity Education				
CLASS+ Writing Support				
Counseling and Psychological Services				
Financial Aid Advising				
Full Circle Food Pantry				
Math Resource and Tutoring Center				
Pat Walker Health Center				
Professor's Office Hours				
Spring International Language Center				
Student Support Services				
TA's Office Hours				
Mentoring Program with a Student Mentor				
Mentoring Program with a Staff Mentor				

11. If freshman, which of the following on-campus resources do you plan on utilizing during this academic year (2018-19)?

	Never Heard Of	Definitely Will Not Use	Probably Will Not Use	Probably Will Use	Definitely Will Use
Academic Advising					
Career Development Center					
Center for Education Access					
Center for Learning and Student Success					
Center for Multicultural and Diversity Education					
CLASS+ Writing Support					
Counseling and Psychological Services					
Financial Aid Advising					
Full Circle Food Pantry					
Math Resource and Tutoring Center					
Pat Walker Health Center					
Professor's Office Hours					
Spring International Language Center					
Student Support Services					
TA's Office Hours					

12. Where do you typically go to study and complete course assignments?
    a. Current residence (off-campus apartment, dorm, etc.)
    b. On-campus library (Mullins, Law Library, etc.)
    c. On-campus public location (Arkansas Union, academic building, etc.)
    d. On-campus resource space (Multicultural Student Center, Tutoring Center, etc.)
    e. Off-campus public location (coffee shop, public library, etc.)
    f. Other
13. When you are struggling with something academically (e.g. what courses to take, a low grade, a difficult assignment), who do you typically turn to for advice?
    a. A professional I trust, like a professor or academic advisor
    b. A more experienced peer, like a tutor or Resident Assistant
    c. A parent or relative
    d. A friend
    e. I figure it out for myself

14. Think of your personal network on campus (e.g. close friends, people who understand you). Where did you meet the majority of the people in your network?
    a. I knew them before coming to campus
    b. A fraternity or sorority
    c. My dorm
    d. Through a registered student organization
    e. Through formal on-campus organizations, like the Multicultural Student Center or Student Support Services
15. Would you be willing to participate in a short (1 hour or less) focus group discussing your experiences (or lack of experience) with on-campus services/resources, like those mentioned above?
    a. Yes
    b. No
16. If yes, please complete the following contact information
    a. Name (First and Last):
    b. Email:

Personal Characteristics

17. What is your current age?
    a. Age:
18. Which of the following best describes your gender?
    a. Woman
    b. Man
    c. Non-binary
    d. Prefer not to answer
19. Which of the following best describes your race/ethnicity?
    a. White
    b. Black/African American
    c. Latinx/Hispanic
    d. Asian
    e. Native American
    f. Hawaiian/Pacific Islander
    g. Multiracial
    h. Prefer not to respond
20. What is the highest degree either of your parents or legal guardian(s) ever completed?
    a. Less than a high school diploma
    b. High school diploma
    c. Technical certificate
    d. Associate's degree
    e. Bachelor's degree
    f. Graduate degree

21. Do you have any siblings who have completed or are currently enrolled in college?
    a. No, none
    b. Yes, one
    c. Yes, more than one
22. Did you graduate from a high school in Arkansas?
    a. Yes
    b. No
23. What was your final cumulative high school GPA? Please report your GPA on a 4.0 scale if possible.
    a. GPA:
24. Are you receiving a federal Pell Grant?
    a. No, I was never offered one
    b. No, I was offered one and declined the award
    c. Yes, I am receiving a Pell Grant
25. Are you receiving an academically-based scholarship, like the Arkansas Lottery Scholarship or the National Merit Scholarship?
    a. No, I was never offered one
    b. No, but I have received one in the past (2017-18 academic year or prior)
    c. Yes, I have an academic scholarship this year (2018-19)
26. Which of the following best describes your current employment status?
    a. I do not work
    b. I work part-time, and have work-study
    c. I work part-time, and do not have work-study
    d. I work full-time

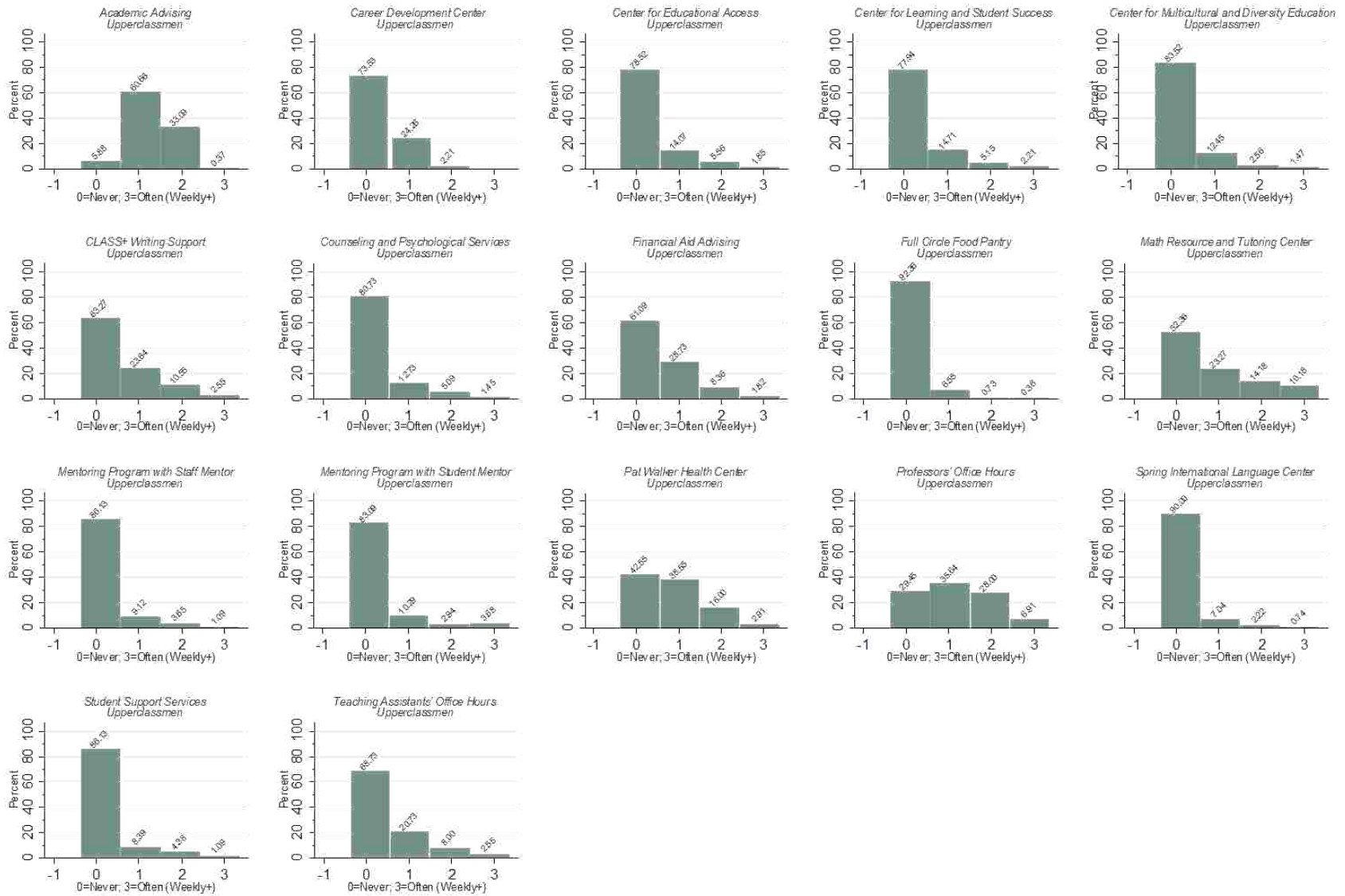# Appendix C: Histograms of On-Campus Service Utilization, U of A Survey

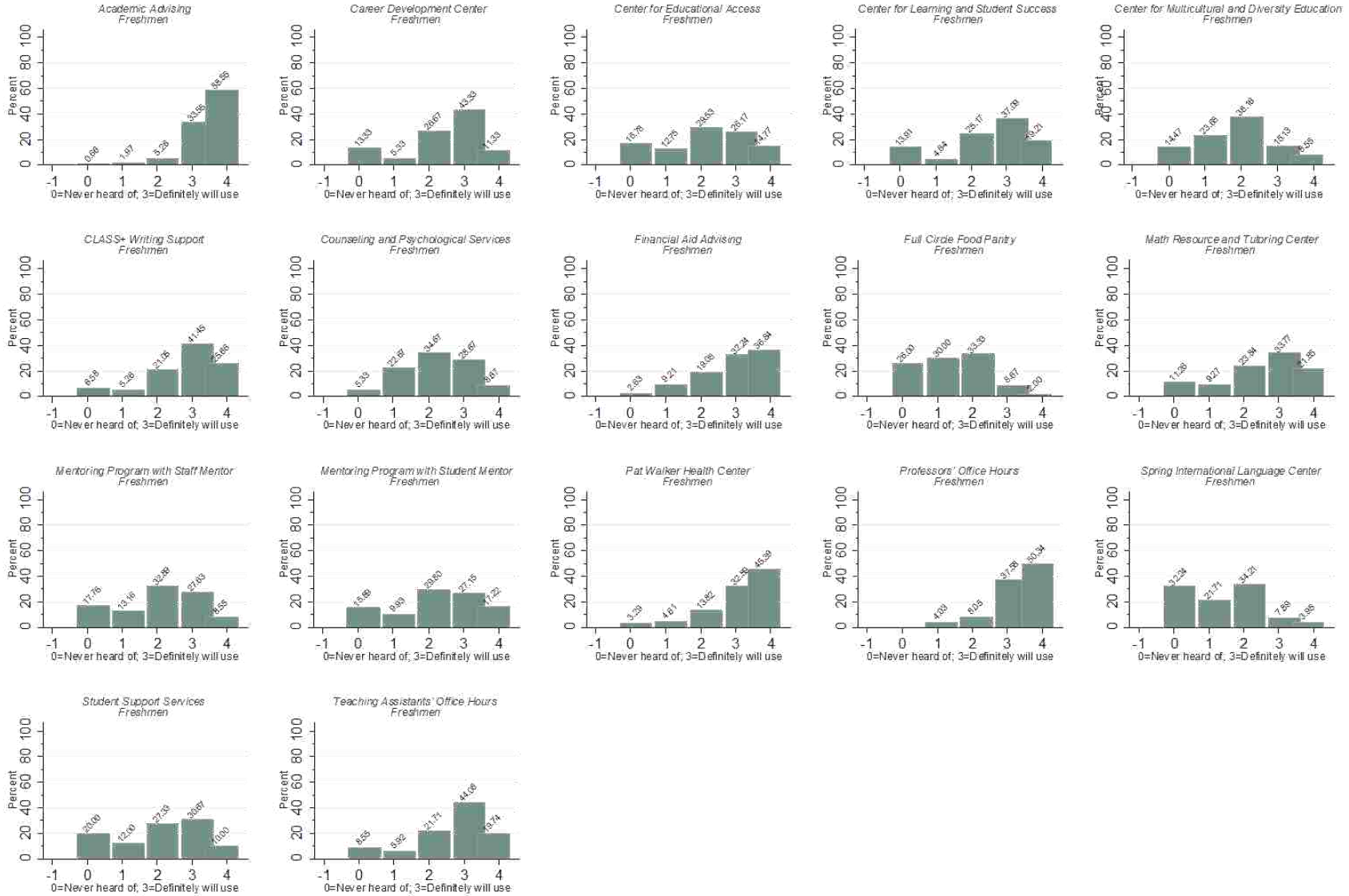*Figure C.1: Reported Service Utilization, Upperclassmen*

Figure C.2: Intended Service Utilization, Freshmen

Conclusion

Education policymakers at school, district, state, and federal levels of governance are increasingly seeking policy levers to increase access to postsecondary education and improve degree completion rates. Increasing rates of postsecondary enrollment and degree completion are important policy goals as technology continues to advance, putting more jobs at risk of being automated and creating new jobs that require a higher level of technical expertise and education. In addition to wanting to increase overall levels of participation in postsecondary education, policymakers also recognize the importance of improving equity in postsecondary outcomes from both a normative standpoint of basic fairness and as a means of addressing growing political discontent over increasing income inequality. This dissertation helps inform the discussion about how to work towards these policy goals by examining three interventions designed to assist students at different stages of their postsecondary journeys.

In chapter one, I describe an experimental evaluation of an intervention with eighth-grade students, the majority of whom are would-be first generation college students. Roughly 900 students in 15 schools are randomly assigned to one of two groups: a control group assigned to receive an informational packet outlining how to prepare for college, detailing in-state postsecondary options, and highlighting educational requirements for different career paths; or a treatment group assigned to receive an informational packet and participate in three visits to a public flagship university. I show that students assigned to the field trips demonstrate higher levels of knowledge about college, show greater engagement on an academic task, are more likely to have conversations about college with school personnel, are less likely to intend to enroll in technical school after high school, and are more likely to enroll in advanced math and science/social science classes in ninth grade. This relatively inexpensive intervention—

partnering with a nearby university to expose students to various aspects of campus life prior to high school—could be replicated by school administrators or teachers interested in increasing college-going rates among their students. The most substantial costs of the intervention are transportation from the schools to the university and the cost of lunch for the students on campus. Schools could work with university recruitment offices to defray some of these costs, and often have some funding already available for field trips that can make this strategy feasible and affordable. These field trips are not high touch interventions, such as one-on-one mentoring programs, that, while effective, are generally expensive and difficult to scale. Instead, these field trips are medium touch interventions that can address opportunity gaps between historically underrepresented students and their more privileged peers.

The experiment presented in chapter one is not without its limitations. First, the sample size (N=885) is small, limiting the study's statistical power. Second, because of the exploratory nature of the work, we test 20 hypotheses at the 90 percent confidence level in our main analyses. Because of statistical error, we would expect two false positive significant findings; we see six significant effects, indicating there is a benefit of these field trips. Third, because we randomize students within schools to improve our statistical power, we might expect spillover and contamination effects between students in the treatment and control conditions. For example, a student who is selected to participate in the visits may return to school and excitedly tell her friends who are not selected to attend about her experiences. Students who are not selected for the visits could also visit the campus on their own initiative, although we have evidence suggesting this is not a significant issue in our study. These limitations suggest that researchers should continue studying the effects of early college experiences on college-going attitudes and

decisions in new contexts to replicate, challenge, and extend the findings presented in chapter one.

In chapter two, I shift from an intervention aimed at addressing gaps in opportunities for students to experience college life early in their postsecondary decision-making process to focus on an intervention aimed at addressing financial barriers to postsecondary access. I present an evaluation of the El Dorado Promise, a community-wide program that guarantees a college scholarship to all students who attend the El Dorado School District for at least ninth through 12th grades. I make use of a longitudinal dataset that includes information on college enrollment and completion for all students graduating from the El Dorado School District between 2004 and 2017. I estimate that the announcement and implementation of the Promise leads to a substantial increase in postsecondary enrollment rates and a smaller, but still significant, increase in bachelor's degree completion rates. This work suggests to policymakers, private philanthropists (who have funded most Promise programs currently in existence around the country), and community members that a broad-based intervention with multiple goals can increase postsecondary enrollment and completion rates.

Again, this work is not without limitations. I use a difference-in-differences analysis to estimate the relationship between the announcement of the Promise program and students' postsecondary outcomes. This quasi-experimental design can identify the causal impact of a program if the treated and comparison groups can be reasonably assumed to be similarly affected by time trends, so that the only mechanism for a change in the difference in outcomes between the groups is the introduction of the intervention. By examining pre-trends in postsecondary enrollment and degree completion as well as running placebo tests to see if the Promise affected unrelated variables, I am able to show suggestive evidence that this assumption is met. However,

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visual inspection of pre-trends in postsecondary enrollment rates and bachelor's degree completion rates indicates that trends in postsecondary outcomes for Promise-ineligible students are volatile over time, complicating efforts to establish a clean identification strategy for estimating the impact of the Promise on postsecondary outcomes. While my results are similar in direction and magnitude to those found in evaluations of the Kalamazoo Promise in Michigan, researchers should continue to evaluate the impact of Promise programs in other contexts as my findings from a mid-sized district in a rural area may not generalize to an urban setting or to Promise programs with different eligibility requirements.

Finally, in chapter three, I shift focus from evaluating interventions that facilitate students' entry into college to describing whether and how students are utilizing on-campus resources to support them in their efforts to complete a postsecondary degree. I use data from a nationally representative survey, a detailed campus-specific survey, and a series of interviews to describe the extent to which undergraduate students utilize on-campus resources, how utilization of on-campus resources is related to students' sense of belonging and second-year persistence, how students learn of on-campus resources, and what barriers students encounter when attempting to utilize on-campus resources. I find that there are differences in on-campus service utilization that are correlated with students' backgrounds; for example, previously lower-achieving students and students from lower-income families are less likely to utilize on-campus resources than are students who were higher achieving in high school and students from higher-income families. As the use of on-campus resources is associated with higher levels of a sense of belonging on campus and increased rates of second-year persistence, these differences in utilization suggest on-campus resources may not be reaching the students who need the most help and may be reinforcing current inequitable patterns in degree completion rates. Through my

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interviews with current undergraduate students, I find that many students learn of on-campus resources in a haphazard fashion, largely from faculty and resident assistants who advocate for services with which they have a personal connection.

This chapter has a number of limitations that suggest important areas of future research. Because of the descriptive nature of this work, I cannot show that the use of on-campus resources causally leads to an increased sense of belonging or second-year persistence. Future work should look for exogenous variation in the availability of on-campus resources to estimate the causal impact of support services on students' postsecondary outcomes. Additionally, future work should include a longer follow-up period to examine the relationship between service utilization and degree completion, rather than simply second-year persistence. Second, the survey I deploy at the University of Arkansas, while detailed in its coverage of on-campus resources, only describes the experiences of a convenience sample of undergraduates willing to complete the survey. Universities should keep a record of which students utilize on-campus resources to gain a better picture of the extent to which their services are known and accessible to students. Similarly, the interviews I conduct at the University of Arkansas likely capture a specific perspective of on-campus services; while all three students identify challenges they encountered when trying to access on-campus resources, they ultimately were able to utilize the services they needed. Future work should examine the experiences of students for whom such services are ultimately inaccessible. Future work should also include a greater diversity of viewpoints; the majority of survey respondents at the University of Arkansas and all students interviewed identified as white students who enrolled in college immediately after high school. Our understanding of the accessibility of on-campus resources would benefit greatly from hearing the experiences of students of color, non-traditional students, students in the LGBT

community, international students, and other students typically overlooked in the dominant discourse about postsecondary education.

Despite the limitations of each individual chapter, this dissertation contributes to our growing understanding of students' postsecondary journeys, from when they first begin to see college as a realistic possibility to their initial enrollment to graduation. This and other work makes it clear that students face multiple, overlapping barriers to higher education. As students, K-12 schools, universities, researchers, and policymakers think about potential strategies for addressing these barriers, this work shows that progress is possible.

Institutional Review Board Approvals

Chapter 1

UNIVERSITY OF
ARKANSAS

To:	Jay Phillip Greene
	GRAD 200
From:	Douglas James Adams, Chair
	IRB Committee
Date:	04/03/2018
Action:	Expedited Approval
Action Date:	03/30/2016
Protocol #:	1706024218R002
Study Title:	An Evaluation of the Educational Impact of College Campus Visits on Randomly Assigned Eighth Grade Students in Northwest Arkansas
Expiration Date:	04/13/2019
Last Approval Date:	04/14/2018

The above-referenced protocol has been approved following expedited review by the IRB Committee that oversees research with human subjects.

If the research involves collaboration with another institution then the research cannot commence until the Committee receives written notification of approval from the collaborating institution's IRB.

It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date.

Protocols are approved for a maximum period of one year. You may not continue any research activity beyond the expiration date without Committee approval. Please submit continuation requests early enough to allow sufficient time for review. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study closure.

Adverse Events: Any serious or unexpected adverse event must be reported to the IRB Committee within 48 hours. All other adverse events should be reported within 10 working days.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, study personnel, or number of participants, please submit an amendment to the IRB. All changes must be approved by the IRB Committee before they can be initiated.

You must maintain a research file for at least 3 years after completion of the study. This file should include all correspondence with the IRB Committee, original signed consent forms, and study data.

cc: Gary Ritter, Investigator
Katherine M Kopotic, Investigator
Elise Swanson, Investigator
Jonathan Norman Mills, Investigator

Chapter 2

UNIVERSITY OF
ARKANSAS

To:	Elise Swanson
	BELL 4188
From:	Douglas James Adams, Chair
	IRB Committee
Date:	03/04/2019
Action:	**Expedited Approval**
Action Date:	02/26/2019
Protocol #:	1711085501R001
Study Title:	Evaluation of the El Dorado Promise
Expiration Date:	01/29/2020
Last Approval Date:	02/26/2019

The above-referenced protocol has been approved following expedited review by the IRB Committee that oversees research with human subjects.

If the research involves collaboration with another institution then the research cannot commence until the Committee receives written notification of approval from the collaborating institution's IRB.

It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date.

Protocols are approved for a maximum period of one year. You may not continue any research activity beyond the expiration date without Committee approval. Please submit continuation requests early enough to allow sufficient time for review. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study closure.

Adverse Events: Any serious or unexpected adverse event must be reported to the IRB Committee within 48 hours. All other adverse events should be reported within 10 working days.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, study personnel, or number of participants, please submit an amendment to the IRB. All changes must be approved by the IRB Committee before they can be initiated.

You must maintain a research file for at least 3 years after completion of the study. This file should include all correspondence with the IRB Committee, original signed consent forms, and study data.

cc: Gary Ritter, Investigator

Chapter 3

UNIVERSITY OF
ARKANSAS

To:	Elise Swanson BELL 4188
From:	Douglas James Adams, Chair IRB Committee
Date:	09/13/2018
Action:	**Exemption Granted**
Action Date:	09/13/2018
Protocol #:	1808134726
Study Title:	Examining the Role of On-Campus Support Services in Facilitating the Transition to College

The above-referenced protocol has been determined to be exempt.

If you wish to make any modifications in the approved protocol that may affect the level of risk to your participants, you must seek approval prior to implementing those changes. All modifications must provide sufficient detail to assess the impact of the change.

If you have any questions or need any assistance from the IRB, please contact the IRB Coordinator at 109 MLKG Building, 5-2208, or irb@uark.edu.

cc: Gema Zamarro Rodriguez, Investigator