

# Recruiting Chapter

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## 1 Introduction

Prior to the pandemic, admissions counselors from colleges and universities traveled to local high schools each year in order to meet prospective students and maintain relationships with guidance counselors at feeder schools (Stevens, 2007). Salazar, Jaquette, & Han (online first) analyzed off-campus recruiting visits made in 2017 by 15 public research universities. Surprisingly, 12 of the 15 universities made more visits to *out-of-state* high schools than *in-state* high schools. These out-of-state visits focused on public schools in affluent, predominantly white communities. Additionally, most public research universities in our sample made a disproportionate number of visits to out-of-state private high schools. For the University of California-Berkeley, for example, 155 (43%) of the 360 out-of-state high school visits were to private high schools. For the University of Colorado-Boulder, 321 (36%) of the 901 out-of-state high school visits were to private high schools.

Whereas Salazar, Jaquette, & Han (online first) primarily analyzed visits to public high schools, this chapter focuses on visits to private high schools. More specifically, we investigate how visits to private high schools by public research universities compare to visits to private high schools by selective private universities.

### 1.1 Social mobility, social reproduction, and privatization

The sociologist Max Weber is credited for the insight that education has a “dual character,” on one hand, serving *social mobility* by redistributing access to privileged positions and, on the other, serving *social reproduction* by granting privileged families disproportionate access to the educational institutions that confer pathways to privileged positions (Stevens, Armstrong, & Arum, 2008).

The mission of selective private colleges and universities is more squarely associated with social reproduction rather than social mobility. Historically, these institutions depend on patronage from philanthropic interests – in connection with business and religious interests – and on wealthy households who provide tuition revenue and donations (Stevens & Gebre-Medhin, 2016). In turn, selective private institutions contribute to social reproduction by providing access to their patrons. The “Chetty” data on parental income by college show that the overwhelming majority of students at selective private institutions have parental income in the top quintile (Burd, 2017; Chetty, Friedman, Saez, Turner, & Yagan, 2020). A significant caveat is that religiously affiliated universities may prioritize enrollment opportunities for students of the same faith regardless of wealth, but even here the mission is to benefit families from a particular cultural status group.

The traditional, albeit mythologized, public good mission of public research universities is tied to social mobility and development of the state (Haycock, Mary, & Engle, 2010; Kezar, Chambers, &

Burkhardt, 2005). Public research universities are designated the unique responsibility of educating the future civic, professional, and business leaders of the state. Quoting 19th century University of Michigan President James Angell, these institutions contribute to social mobility by providing “an uncommon education for the common man” (as cited in Rudolph, 1962, p. 279) who could not afford tuition at elite private institutions.

We argue that the recruiting behavior of colleges and universities is an indicator of organizational enrollment priorities and, in turn, the extent to which enrollment priorities serve social mobility or social reproduction. Recruiting visits to private high schools are consistent with the social reproduction mission of selective private universities, regardless of whether the university is targeting a particular high school because of its academic reputation, religious affiliation, or the affluence of its student body. By contrast, for public research universities, visits to private high schools – particularly out-of-state schools – are antithetical to the mission of social mobility for high-achieving, low-income state residents.

Analyses of recruiting visits to private high schools can contribute novel insights about the “privatization” of public research universities. Within the scholarly literature on privatization, one strand of scholarship conceptualizes privatization as a process whereby declines in government funding cause public institutions to grow alternative revenue sources, particularly revenue from tuition and research commercialization (McClure, Barringer, & Brown, 2019; Slaughter & Leslie, 1997). Of relevance to this chapter, public research universities responded to declines in state appropriations by growing enrollment from nonresident students (Jaquette & Curs, 2015), who typically pay two- to three-times more than resident students. A second strand within the privatization literature conceptualizes privatization as a process whereby public institutions become more similar – in terms of characteristics or behavior – to for-profit or private non-profit organizations (McClure, Barringer, & Brown, 2019). A weakness of this literature is that few empirical studies analyze public institutions on a behavior associated with private institutions.

Therefore, this chapter compares public research universities to selective private universities on the dimension of recruiting visits to private high schools, a behavior associated with the social reproduction orientation of selective private universities. Our primary goal is to learn about public research universities, using the behavior of private universities as a benchmark to develop more thoughtful insights about public research universities. We analyze recruiting visits made in the 2017 calendar year by a sample of 15 public research universities and 14 selective private universities.

Because little is known about recruiting at private high schools by public universities, we conduct descriptive analyses that seek to identify basic patterns and relationships. Because a recruiting visit to the same private high school is an indicator of a relationship between two actors, we also utilize social network methods in order to compare the recruiting networks of public universities to those of private universities. Analyses are informed by the following three research questions:

1. How does the scale of visits to private high schools by public research universities compare to the scale of visits to private high schools by selective private universities?
2. How do the characteristics of private high schools visited by public research universities compare to the characteristics of private high schools visited by selective private universities?
3. To what extent do public research universities and selective private universities visit overlapping sets of private high schools?

## 2 What do we know about off-campus recruiting visits

This section provides context for our analyses. First, we situate off-campus recruiting within the broader set of marketing and recruiting interventions in higher education and review what market research says about off-campus recruiting. Second, we review empirical scholarship from sociology that considers off-campus recruiting, emphasizing scholarship that considers the relational aspects of recruiting visits and scholarship that considers private high schools.

### 2.1 Situating off-campus recruiting within enrollment management

The “enrollment funnel” – depicted in Figure 1 – is a conceptual heuristic that identifies stages in the student recruitment process (prospects, inquiries, applicants, accepted applicants, and enrolled students). “Prospects” are “all the potential students you would want to attract to your institution” (Campbell, 2017). “Inquiries” are prospects that contact the institution, including those who respond to a solicitation and those who reach out on their own. The enrollment management industry uses the enrollment funnel to inform marketing and recruiting interventions that target specific stages. Most scholarship on enrollment management focuses on the final stages of the enrollment funnel, specifically which applicants are admitted and the use of financial aid “leveraging” to convert admits to enrollees (e.g., Alon, 2009; Doyle, 2010; Karabel, 2005; Karen, 1990; M. S. McPherson & Schapiro, 1998; Posselt, 2016; Waddell & Singell, 2011). By contrast, the enrollment management industry expends substantial resources on marketing/recruiting activities that target earlier stages of the enrollment funnel (Noel-Levitz, 2020).

INSERT FIGURE 1 ABOUT HERE

Institutions identify undergraduate “prospects” by purchasing “student lists” – containing contact, demographic, and academic achievement information – from College Board, ACT, and other vendors. Universities control which prospects are contained within a list by filtering on criteria such as zip code, test scores, and high school GPA. Once prospects and inquiries are identified, they are targeted with remote and face-to-face recruiting interventions designed to solicit applications and deepen engagement. Remote recruiting interventions include postcards, brochures, emails, text messages, and targeted social media. Face-to-face recruiting interventions include on-campus visits by prospects and off-campus recruiting visits by admissions representatives to high schools, community colleges, college fairs, etc. Institutions utilize advertising (traditional and digital) and social media to solicit inquiries and to create positive “buzz” amongst prospects (Dupaul & Harris, 2012). Given the rise in “stealth applicants” who do not inquire before applying (Dupaul & Harris, 2012), advertising and social media enables universities to tell their story to prospects who do not wish to be contacted.

What do we know about off-campus recruiting from previous research? As is true for most aspects of enrollment management, much of what we know about off-campus recruiting comes from consulting firms (e.g., Ruffalo-Noel Levitz, EAB), professional associations (e.g., NACAC), and from practitioner-oriented publications. Market research describes off-campus recruiting visits as a means of identifying prospects and deepening engagement with prospects already being targeted through mail/email (Clinedinst & Koranteng, 2017; Noel-Levitz, 2020; Ruffalo Noel-Levitz, 2018).

Ruffalo Noel-Levitz (2018) documents the self-reported efficacy of marketing/recruiting interventions. For the median private 4-yr institution, off-campus visits were the second highest source of inquiries (after student list purchases), accounting for 17% of inquiries. Off-campus visits were tied with student list purchases as the highest source of enrollees, accounting for 18% of enrollees. For

the median public institution, off-campus visits accounted for 19% of inquiries (second only to student list purchases) and accounted for 16% of enrollees (ranked third after stealth applicants and on-campus visits).

With respect to expenditure, Table 1, reproduced from Noel-Levitz (2020), shows the percentage of undergraduate recruitment budget allocated to different marketing and recruiting activities.<sup>1</sup> The average public university spent 16% of its recruiting budget on off-campus recruiting visits, compared to 12% of its budget on purchasing student lists and 17% of its budget on “prospective student communications” (e.g., mail, email, text, social media) targeting prospects and inquiries. An emergent trend over the past decade – partially a response to public universities seeking nonresident students – has been the growth of “regional recruiters” who target specific metropolitan areas in the US and abroad (Whitney & Schmidt, 2015). These regional recruiters may be college/university employees or they may be independent contractors who live in the metropolitan area they recruit.

## 2.2 Empirical scholarship from sociology

Empirical academic scholarship on off-campus recruiting is mostly limited to a modest number of sociological case studies, which typically analyze off-campus recruiting as part of a broader analysis of enrollment management (e.g., Cottom, 2017; Holland, 2019; Khan, 2011; Posecznick, 2017; Stevens, 2007). Holland (2019) analyzes visits from the perspective of students at two racially and socioeconomically diverse public high schools. Holland (2019) found that high school visits – including college fairs, instant decision events, and small-group representative visits – influenced where students applied and where they enrolled. This finding was strongest for first-generation students and underrepresented students of color, who often reported that “school counselors had low expectations for them and were too quick to suggest that they attend community college” (p. XXX). This trust vacuum created an opportunity for colleges because these students were drawn to colleges that connected with them and made them feel wanted. For example, Holland (2019) describes a high-achieving, first-generation, African American student who was admitted by a highly selective liberal arts college but chose to attend a less selective college that “seemed to want him more” (p. XXX). By contrast, affluent students with college-educated parents were less taken by such overtures and more concerned with college prestige.

Stevens (2007), in an ethnography of the admissions office at a selective private liberal arts college, highlights the relational function of off-campus recruiting visits. Stevens (2007, p. 54) states that “the College’s reputation and the quality of its applicant pool are dependent upon its connections with high schools nationwide.” Therefore, during the autumn “travel season,” admissions officers visit selected high schools across the country “to spread word of the institution and maintain relationships with guidance counselors” (p. 53-54). The College tended to visit the same “feeder” schools year after year because recruiting depends on long-term relationships with high schools. The high schools they visited tend to be affluent schools – in particular, private schools – that enroll high-achieving students who can afford tuition and have the resources and motivation to host a successful visit. Whereas Ruffalo Noel-Levitz (2018) highlights the effect of recruiting visits on inquiries and enrollees, findings from Stevens (2007) suggest that the College may have valued recruiting visits primarily as a means of maintaining relationships with guidance counselors. From this perspective, recruiting visits may affect outcomes such as inquiries, applications, and matriculation through their effect

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<sup>1</sup>Table drawn directly from Noel-Levitz (2020) Figure 9, which is based on a convenience sample of 45 four-year non-profit institutions and 21 four-year public institutions.

on high school guidance counselors. The logic is that a guidance counselor who views a college favorably will steer students to the college.

Although not about recruiting visits per se, Khan (2010, 2011) is centrally important for our study because he lays out a conceptual explanation of why colleges and private high schools develop relationships with one another (i.e., what is each trying to obtain from the other). Khan (2010) analyzed recruiting from the perspective of an elite private boarding school in order to understand “how such schools continue to get comparatively under-qualified students into top colleges and universities” (p. 98). The answer begins by considering the goals of colleges, which are represented by admissions officers, and the goals of private high schools, which are represented by guidance counselors. Colleges want high-achieving students who can pay tuition and donate. They want low acceptance and high yield rates, which are important for rankings. Colleges also want a class composed of “interesting characters” whose curricular and extracurricular strengths meet the needs of important campus constituents (e.g., academic majors, the athletic department, clubs, etc.). Elite private high schools want to send *all* students to the best college possible. Here, high school guidance counselors face “the pressure of making sure their school seems worth it – that ... paying some \$40,000+, really does aid students in the college process” (Khan, 2010, p. 105).

The challenge faced by high school counselors at elite private schools is that “some of these students are slightly better than others. These students will likely get into more than one school – but they can only attend one. And this will lower the chances of your ‘second-best’ students getting into top schools” (Khan, 2011, pp. 173–174). “Luckily,” Khan (2010, p. 105) writes, “the problem for elite boarding schools matches up quite nicely with the problem faced by elite colleges.” That is, although college admissions officers receive applications from many outstanding students,

These outstanding students will also be outstanding to Princeton, Yale, Stanford, and everywhere else. How do you know the ones you pick will attend your school? You can’t quite trust applicants, as they are all likely to tell you how much they want to go to your school. And if students you accept go somewhere else, there’s not much you can do. But you can get better information – information you want – from their high school. And you can reward that school for good information and sanction it for bad information (Khan, 2011, p. 173).

This desire by colleges for trustworthy information about applicant intentions creates an opportunity for high school counselors to advocate on behalf of their students. This opportunity depends on guidance counselors having personal relationships with university admissions offices and on having small enough caseloads to advocate for each student individually.

To explain how high school counselors capitalize on this opportunity, Khan (2011) describes two hypothetical students – Susan and Billy – who both apply to Harvard and Yale. Susan is a shoo-in at both universities, but wants to attend Harvard. Billy has a weaker academic record than most Ivy League students, but has strong extracurricular activities. The guidance counselor tells Harvard that Susan wants to attend Harvard. Next, he informs Yale that Susan will choose Harvard, but Billy loves Yale and has great “character” and extracurricular activities. In the end, Harvard rejects Billy and accepts Susan, thereby, decreasing acceptance rate and increasing yield. Yale rejects Susan and accepts Billy, thereby, also decreasing acceptance rate and increasing yield.

The horsetrading described by Khan (2011) depends on a relationship where the college can trust statements made by the high school counselor and vice-versa. This relationship is the product of repeated interactions over many years. A high school that makes false statements about applicant intentions faces consequences. The college “might stop taking these telephone calls and ignore the

information provided. They may even start accepting fewer students from the school, thinking it is less than an honest place” (Khan, 2010, p. 106). Because the college and the high school are mutually dependent, however, both “have an incentive to continue with a strong, honest relationship” (Khan, 2010, p. 106). Although, such horsetrading may be less pervasive now than it was in prior decades and may be less common at non-elite private schools. Additionally, college admissions officers from public universities likely have less authority to engage in these tacit negotiations because admissions criteria at public universities face greater public scrutiny than admissions criteria at private colleges and universities.

### **2.2.1 Visits as an indicator of a social relation**

Stevens (2007) and Khan (2010, 2011) suggest that strong relationships are mutually important for the college and for the private high school. Strong relationships enable colleges and schools to negotiate and send trustworthy information to one another. Without a strong relationship, it is unlikely that a college admissions counselor will “take the call” of a high school guidance counselor (Khan, 2010, 2011). Even in the absence of the horsetrading described by Khan (2011), relationships enable the college admissions counselor and the high school guidance counselor to tell one another “their story” and relay that story to constituents (Stevens, 2007). The college admissions counselor explains why the college/university is a “special place” that high school students should want to attend (Stevens, 2007). The guidance counselor explains why the high school is a special place, that even students with lower grades have outstanding extracurricular strengths that will benefit the college (Khan, 2010).

The presence of a recruiting visit between a college and a private high school is an indicator that the college and the high school have a relationship. From an empirical perspective, Stevens (2007) finds that off-campus recruiting visits are important for the maintenance of strong relationships between a college and a high school. From a logical perspective, we argue that, first, the fact that the college made the effort to visit suggests that the college wants to enroll students from the high school. Second, the fact that the high school hosted the visit suggests that the high school likely views the college as a desirable destination for some of its students. Third, the presence of the recruiting visit suggests the probability of additional interactions (e.g., phone calls).

Conceptualizing a recruiting visit as an indicator of a relationship between a college and a high school motivates the use of social network methods, which analyze the network defined by “network ties” (i.e., visits) between actors (colleges and high schools). Prior research has not used social network methods to analyze recruiting visits from colleges to high schools. Analyzing the network of recruiting visits to high schools enables us to investigate the extent to which public research universities are visiting similar sets of private high schools as private colleges and universities, and also the extent to which they are visiting the same private high schools. In turn, we hope these analyses yield novel insights to scholarship on the privatization of public higher education.

## **3 Social network analysis concepts**

Having conceptualized a recruiting visit as an indicator of a social relation, this section introduces basic concepts from social network analysis and motivates the research questions that guide empirical analyses.

A social network consists of a set of actors – referred to as “vertices” – and the connections – referred to as “network ties” or “edges” between these actors. “One-mode” networks consist of vertices of a “type.” For example, the social network of Facebook consists of users (vertices) who are connected to one another via friendship ties (edges). Similarly, the social network of Twitter consists of handles (vertices) who are connected to one another by following or being followed.

Whereas “one-mode” networks consist of vertices of the same “type” (e.g., in a publication network, each vertex is an author), “two-mode” networks consist of vertices associated with one type of actor/entity having connections to vertices of another type. For example, an actor-movie network consists of actors (mode 1) who appear in movies (mode 2), and an actor shares an edge with a movie if the actor appears in the movie. The most commonly analyzed two-mode network in social networks literature is a corporate board-director network (e.g., Davis, Yoo, & Baker, 2003). These networks consist of directors (mode 1) and organizational boards (mode 2), and a particular director shares an edge with a particular organizational board if they sit on that board. Similarly, our recruiting visit data form a two-mode network, consisting of private high schools (mode 1) and colleges (mode 2). An off-campus recruiting visit from a college/university to a private high school is the “edge” that connects two particular vertices. In this network, edges can only occur between vertices of a different type; that is, a college can visit a high school, but colleges cannot visit other colleges and high schools cannot receive visits from other high schools.

To reduce complexity, two-mode network graphs are often analyzed as one-mode networks (Borgatti, 2008; Davis, Yoo, & Baker, 2003). Our two-mode college-school network can be transformed into a one-mode college network in which each vertex is a college/university and two colleges share an edge if both colleges visited at least one high school in common. The *weight* of an edge indicates the number of high schools that both colleges visited. For example, if there are 200 private high schools that received a visit from both Notre Dame and Villanova, the weight of the edge between Notre Dame and Villanova is 200.

### 3.1 RQ1: Degree centrality

In social network analysis, *centrality* refers to the importance or prominence or “being in the middle of things” of an actor/vertex in a social network. Many alternative measures of centrality have been developed. All measures agree that centrality is an actor/vertex-level construct (e.g., each college in our network will have a centrality value, regardless of which centrality measure we use). However, different measures of centrality are based on different theoretical conceptualizations – for example, being directly connected to the most actors versus being the intermediary between otherwise disconnected actors – and are operationalized using different mathematical algorithms.

The simplest measure of centrality, *degree centrality* measures the number of edges directly connected to a vertex. For each college in our two-mode network, degree centrality is simply the number of different private high schools visited by the college. For each high school in our network, degree centrality is the number of colleges in our network that visited the high school. Social network theory conceptualizes degree centrality as a measure of “local” centrality, capturing the number of direct connections for each actor/vertex. For our empirical context, we conceive of degree centrality as a measure of scale of the number of private high schools a college visits and, equivalently, the number of private high schools we observe having a social relation with each college. Given that we conceptualize visits to private high schools as a behavior consistent with the social reproduction orientation of selective private colleges/universities, we are interested in comparing how scale differs

between public and private colleges/universities. This interest motivates research question 1, “How does the scale of visits to private high schools by public research universities compare to the scale of visits to private high schools by selective private universities?” We answer this research question by comparing degree centrality across universities.

Degree is a limited measure of centrality in that it only identifies direct connections. By contrast, *k-path centrality* measures the extent to which an actor/vertex is indirectly connected to others, *betweenness centrality* measures the extent to which a vertex is an intermediary between otherwise disconnected groups of actors, and *eigenvector centrality* measures the extent to which a vertex is connected to highly-connected others. Betweenness centrality tends to be relevant for empirical contexts (e.g., which manager gets credit for an idea) where an actor who occupies a position between groups can benefit by being a broker of information/ideas (Burt, 1992). By contrast, this chapter is more concerned with whether a particular college tends to have indirect connections with some colleges but not others, and what is the subset of high schools this group of colleges tends to visit. Research question 3, motivated below, explores these ideas.

### 3.2 RQ2: Ego networks and homophily

Because the data structure of networks is complicated, a useful first step is to analyze “ego networks” rather than the entire social network. An “ego” is a single “focal” node (e.g., The University of Notre Dame). An ego network consists “of a focal node (‘ego’) and the nodes to whom ego is directly connected to (these are called ‘alters’) plus the ties, if any, among the alters” (p. XXX). For example, the University of Notre Dame ego network consists of all private high schools that received at least one visit from Notre Dame. Additionally, for each high school visited by Notre Dame, the ego network may include all colleges/universities in our sample that also visited the high school. This chapter analyzes recruiting visits to private high schools by 41 colleges and universities, which we can think of as 41 ego networks.

A common finding in social networks research is that actors are more likely to form connections with actors who are similar to them (M. McPherson, Smith-Lovin, & Cook, 2001). Said differently, ego networks are biased towards “homophily” rather than “heterophily.” Homophily is the idea that two vertices are more likely to be connected if they have similar characteristics (e.g., two people are more likely to be friends on Facebook if they have similar political ideologies). Heterophily, the opposite of homophily, is when pairs of connected vertices have different characteristics from one another.

In our analyses of recruiting visits from colleges to private high schools, we are interested in the existence of homophily versus heterophily for two reasons. First, prior scholarship suggests that private colleges and private high schools are more likely to have a relationship when they share common ideologies or view themselves as belonging to the same echelon (Khan, 2010, 2011; Stevens, 2007). Second, with respect to our substantive interest in the behavior of public research universities, the characteristics of visited private high schools have consequences for subsequent enrollment compositions of public research universities. Therefore, we are interested in whether universities tend to visit high schools that are similar to them on certain characteristics. Additionally, we are interested in whether public research universities favor high schools with certain characteristics, independent of homophily. These interests motivate research question 2, “How do the characteristics of private high schools visited by public research universities compare to the characteristics of private high schools visited by private universities?”



Decisions about which private school characteristics to analyze were informed by prior research (e.g., Graham, 1999; Khan, 2010; Murnane & Reardon, 2018; Purdy, 2018; Stevens, 2007). In particular, Murnane & Reardon (2018) used data from several national surveys to analyze long-term trends in private school enrollment by family income. The percentage of American (elementary school) students attending private school declined from 15% in the mid-1960s to 10% in the mid-1970s, and declined gradually from 11% in 1999 to 9% in 2015. With respect to family income, the private school enrollment rate of high-income families (around 17%) and low-income families (around 4%) remained stable over time, but the enrollment rate for middle-income families declined from 12% in 1968 to 6% in 2013. These declines were substantially driven by declines in the number of students attending Catholic schools, which represented 89% of private school enrollment in 1965 and 42% of enrollment in 2013. Private school enrollment rates are higher for families located in urban areas than those in suburban areas. With respect to race, in 2013, 11% of white students attended private school compared to 5% of Black students, and 3% of Hispanic students. However, for high income families, rates of private school enrollment do not differ substantially across race. In the South, there has been a long-term increase in private school enrollment, driven by growing enrollment in Christian private schools by middle-income families and growing enrollment in nonsectarian private schools by high-income families.

Based on these findings and logical argument (and also data limitations), our analyses focus on the following private school characteristics: geographic region, religious affiliation, academic reputation, racial composition, and enrollment size. We analyze geographic region because, for most colleges and universities, enrollment demand is likely to be stronger at high schools in the same geographic region, but nationally prestigious colleges and universities may experience high demand throughout the country. We analyze religious affiliation because private colleges are more likely to have a relationship with private high schools with a similar religious affiliation. Although public universities are formally secular, we are interested in whether particular public universities tend to target religiously affiliated private high schools. We analyze academic reputation based on the idea that more highly ranked colleges are likely to target highly ranked private high schools. Racial composition is of substantive interest because the racial composition of visited high schools has consequences for the racial composition of colleges and universities. Given our interests in social reproduction versus social mobility, we would also analyze tuition price and household income, but these data are not available for private high schools.

### 3.3 RQ3: Network similarity and community detection

This chapter conceptualizes recruiting visits to private high schools as a behavior consistent with the social reproduction orientation of selective private colleges and universities. We are interested in how similar the recruiting networks of public research universities are to those of private colleges and universities, thereby motivating research question 3, “To what extent do public research universities and private universities visit overlapping sets of private high schools?”

We address RQ3 by graphing the recruiting network and by identifying “clusters” of universities that have similar recruiting networks. First, network graphs show vertices (e.g., universities) as circles, with vertices that share many connections located close together and vertices that are very “central” – many direct and indirect connections to other nodes in the network – are located near the center of the graph. In addition to network graphs, network scholarship often uses cluster analysis methodologies to identify vertices that share common structure, based purely on patterns of network ties.

## 4 Data and methods

Our broader project collected data on off-campus recruiting visits made by a convenience sample of colleges and universities during the 2017 calendar year. The data collection sample comes from two different lists of postsecondary institutions: all public research-extensive universities as defined by the 2000 Carnegie Classification (N=102), and all private universities in the top 100 of U.S. News and World Report National Universities rankings (N=58). For each of these institutions, we investigated their admissions website for pages that posted their upcoming off-campus recruiting visits. For institutions that posted such pages, we scraped the pages once per week throughout 2017. Many colleges and universities only posted certain kinds of events (e.g., hotel receptions and national college fairs) but not others (e.g., day-time visits to high schools). These institutions are excluded from the analyses. Our final analysis sample consists of 15 public research universities and 14 private research universities.

INSERT TABLE 2 ABOUT HERE

Table 2 shows selected characteristics for the universities in our analysis sample. Given that we collected recruiting data for private universities ranked in the top 100 of U.S. News and World Report, one concern is whether it makes sense to compare public research universities not ranked in the top 100 to private universities ranked in the top 100. However, the columns in Table 2 for 25th and 75th percentile SAT score of enrolled freshmen suggest that private universities ranked lower than 75 have test score ranges that are fairly similar to public research universities not ranked in the top 100. The five public research universities ranked 124 or below have score ranges that are modestly lower, particularly the University of Nebraska-Lincoln, but remain comparable to private universities ranked 75 to 100. One exception is that Stevens Institute of Technology (rank 80) has substantially higher test scores.

The data on university characteristics come from the 2017 Integrated Postsecondary Education Data System (IPEDS) and 2020 Best Colleges ranking by U.S. News & World Report. For the high schools in our analysis, we use secondary data from the 2017-18 NCES Common Core of Data (CCD) for public high schools, and the 2017-18 NCES Private School Universe Survey (PSS) and 2020 Best Private High Schools ranking by Niche for private high schools.<sup>2</sup> Only high schools that enroll at least 10 12th grade students, is not primarily a virtual school, and is located in the 50 U.S. states, the District of Columbia, or land regulated by the Bureau of Indian Affairs is included in our analysis.

## 5 Results

### 5.1 RQ1: Scale of visits

Research question 1 asks, “How does the scale of visits to private high schools by public research universities compare to the scale of visits to private high schools by selective private universities?” This question can be answered by counting the number of visits to private high schools, which is equivalent to calculating the degree centrality for each university. In addition to scale, we are also interested in the relative scale of visits to private high schools. That is, the number of visits to

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<sup>2</sup>For both public and private high schools, we also used NCES data from previous years when the 2017-18 data was not available for a small amount of schools.

private high schools as a proportion of all off-campus recruiting visits, or as a proportion of all recruiting visits to high schools.

Appendix Figures 16 and 17 show the number of visits by “type” (public high school, private high school, community college, other) for public research universities and selective private universities, respectively. On average, the 15 public research universities in our sample conducted 1,568 off-campus recruiting events in 2017, ranging from a low of 914 for the University of Georgia to a high of 4,466 for the University of Alabama. By contrast, the 14 selective private universities in our sample conducted an average of 959 events, ranging from a low of 560 by Stevens Institute of Technology (located in Hoboken, NJ) to a high of 1,432 by Marquette University (located in Milwaukee, WI). Across all public research universities, 81.3% of visits were to a public or private high school, whereas for selective private universities 86.2% of all visits were to a public or private high school. The lower percentage for public research universities is because many public research universities made a substantial number of visits to community colleges whereas private universities did not.

Figures 2 and 3 show the number of visits to private high schools and public high schools for public research universities (Figure 2) and selective private universities (Figure 3), with each bar shaded by percent in-state versus out-of-state visits. Only three of the 15 public research universities – UC-Berkeley, UC-San Diego, and UC-Riverside – made more in-state than out-of-state total high school visits. Notably, the University of California voluntarily adopted a nonresident enrollment cap in 2017, following pressure from state legislators who had issued a bill to cap nonresident enrollment. Of the 14 selective private universities in our sample, only Baylor University (Waco, TX) made more in-state than out-of-state total high school visits.

INSERT FIGURE 2 AND FIGURE 3 ABOUT HERE

With respect to research question 1, the scale of visits to private high schools by public research universities ranged from a low of 100 visits by UC-Riverside to a high of 1,039 visits by the University of Alabama (which accounted for 21.9% of all visits to private schools by public research universities in our sample), with the median university, The University of Pittsburgh, making 267 visits. Across all public research universities, 83.2% of private high school visits were to out-of-state schools while 64.4% of public high school visits were to out-of-state schools. This result is consistent with the notion that public research universities placed more value on out-of-state private high school students than in-state private high school students because out-of-state students generate substantially more tuition revenue.

For selective private universities, the number of visits to private high schools ranged from a low of 181 by Stevens Institute of Technology to a high of 723 by Notre Dame, with the median universities – Boston College and Northwestern University – visiting 349 and 390 private high schools, respectively. Thus, for the universities in our sample, the scale of visits to private high schools tended to be higher for selective private universities than public research universities. That said, several public research universities in our sample – University of Colorado-Boulder (402 visits), University of South Carolina (498 visits), and University of Alabama (1,039 visits) – made a relatively high number of private high school visits even when compared to the selective private universities in our sample.

The relative scale of visits to private high schools – defined as private high school visits as a percentage of all high school visits – also tended to be substantially higher at selective private universities than at public research universities. Across all selective private universities in our sample, 48.8% of high school visits were to private high schools, compared to 24.8% for public research universities. Although, the relative emphasis on private high schools was a bit closer for

out-of-state visits; across all selective private universities, 52.9% of out-of-state high school visits were to private schools, compared to 29.9% for public research universities.

Even though selective private universities tend to emphasize visits to private high schools more than public research universities, both groups visited private high schools at a much higher rate than public high schools. Figure 4 (public universities) and Figure 5 (private universities) show the actual number of private school visits made compared to the hypothetical number of private school visits if each public and private high school in the nation had an equal probability of receiving a visit.<sup>3</sup> Figure 4 shows that the actual number of private school visits exceeded the proportional number of private school visits for 13 of the 15 public research universities in our sample, the exceptions being UC-Riverside and SUNY Stony Brook. For UC-Berkeley, private school visits represented 27% of all high school visits but would have represented 19% had UC-Berkeley visited public and private schools at the same rate. For the University of Georgia, which represented the extreme for public universities, private school visits represented 37% of all high school visits but would have represented 19% had the university visited public and private schools at the same rate. Figure 5 shows that this disparity between actual versus proportional visits was much greater for private universities than public universities. Catholic universities made the most disproportionate number of private high school visits. For Notre Dame, private school visits represented 63% of actual high school visits but would have represented 18% of proportional visits.

INSERT FIGURE 4 AND FIGURE 5 ABOUT HERE

## 5.2 RQ2: Characteristics of visited schools

Figures 6 through 12 address research question 2, “How do the characteristics of private high schools visited by public research universities compare to the characteristics of private high schools visited by selective private universities?”

Figure 6 shows the geographic region – Northeast, Midwest, South, and West – of visited private high schools, separately for public research universities (top panel) and selective private universities (bottom panel). Scholarship on the relationship between geographic proximity and student demand tends to find that nationally prestigious universities enjoy strong demand across the nation, while less prestigious universities rely primarily on demand from students located nearby (e.g., Hoxby, 1997). The visit patterns for private universities are consistent with this finding; less prestigious universities tended to focus on private high schools in their home region, while more prestigious universities tended to visit many private high schools outside their home region. Similarly, scholarship on student demand for out-of-state public universities finds that most public universities rely on demand from out-of-state students living in nearby states (Mak & Moncur, 2003; Mixon & Hsing, 1994; Zhang, 2007). Most public research universities in our sample visited a disproportionate number of private high schools in their home geographic region. UC-Berkeley and CU Boulder – universities with strong national brand recognition – visited a large number of private high schools outside their home region.

INSERT FIGURE 6 ABOUT HERE

In the universe of all private high schools (top row of Figure 6), there are more schools located in the

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<sup>3</sup>When calculating the hypothetical, proportional number of visits for each university, we only consider high schools in states that received at least one visit to a public or private high school from that university. Our rationale for this decision is that it is unhelpful to include schools in states that the university ignored entirely.

South than any other geographic region, consistent with the finding from Murnane & Reardon (2018) about the long-term growth in private school enrollment in the South. Universities not located in the South tended to visit more private high schools in the South than any other region, except their home region. This finding emerged for both the public universities and private universities in our sample.

Figure 7 shows the religious affiliation – Catholic, Christian, Nonsectarian, and Other – of visited private high schools. The results for selective private universities (bottom panel) follow our expectations: Nonsectarian universities tended to visit a higher proportion of nonsectarian private high schools; Catholic universities visited a higher proportion of Catholic high schools; and Christian universities tended to visit a relatively higher share of Christian high schools.

INSERT FIGURE 7 ABOUT HERE

Results for public research universities (top panel) are more interesting. Despite being nonsectarian, the majority of public research universities visited a high share of religiously affiliated private high schools, particularly Catholic schools. Surprisingly, Catholic schools represented at least 40% of private high school visits for 10 of the 15 public research universities in our sample. By contrast, Catholic schools represented at least 40% of visits for only 6 of the 14 selective private universities in our sample (the four Catholic universities and also Texas Christian University and Stevens Institute of Technology). For public research universities, the emphasis on visiting Catholic and Christian high schools rather than nonsectarian private high schools tended to be stronger at less prestigious institutions.

Figure 8 shows the academic reputation – defined by the Niche private high school ranking – of visited private high schools. For the private universities in our sample, we see the predictable pattern that more highly ranked universities tend to visit a higher share of private high schools that are ranked in the top 200 nationally or are rated “A+” whereas less prestigious universities visited a higher share of private high schools rated “A” or “A- or below.” Notre Dame University is a notable exception to this pattern. A potential explanation is that Notre Dame has developed a strategy of targeting the very top students at relatively less-prestigious Catholic high schools, believing that these students will choose Notre Dame because of its status as the preeminent Catholic University.

INSERT FIGURE 8 ABOUT HERE

A similar pattern emerged for the public research universities in our sample; more highly ranked universities tended to visit a higher share of highly rated private high schools than lower ranked universities. In comparison to the private universities in our sample, the public universities in our sample tended to visit a higher share of private high schools that were not highly rated. To a great extent, this finding is merely a consequence of our sampling strategy; we attempted to collect recruiting visit data from all public research universities but we only collected recruiting visit data from private universities ranked in the top 100 of U.S. News and World Report. That said, the finding that public research universities visited a large share of low-rated private high schools is consistent with the idea that many public research universities visit private high schools in search of full-pay students rather than academic superstars.

Figure 9 shows the 12th grade enrollment of visited private high schools. Compared to the universe of private high schools, the universities in our sample tended to visit schools that enrolled more 12th graders. Generally, the findings were pretty similar across public and private universities; for most universities, more than half of private school visits were to schools that enrolled at least 100 12th graders. However, public universities tended to visit a slightly larger share of high schools with

fewer than 50 12th graders and private universities tended to visit a higher share of high schools with 12th grade enrollment of 50-100.

INSERT FIGURES 9 AND 10 ABOUT HERE

Figure 10 shows the 12th grade enrollment of visited private high schools as well as the 12th grade enrollment of visited public high schools for the public research universities in our sample. As seen, a large majority of public high school visits for all 15 universities were to schools with more than 150 12th graders enrolled (bottom panel). By contrast, most of the visited private schools tended to have fewer than 150 12th graders enrolled. Although this is somewhat to be expected, as public high schools tend to be larger in size than private schools (top rows of Figure 10), there still appears to be a disproportionate amount of smaller private high schools visited compared to smaller public high schools. This suggests that the public universities in our sample were willing to take the time to visit private schools, even when they enroll far fewer 12th graders.

Figure 11 shows the percentage of 12th graders who identify as Black, Latinx, or Native at visited private high schools. Consistent with Murnane & Reardon (2018), most private high schools enroll relatively few students from historically underrepresented race/ethnicity groups. For over 65% of schools in the universe of private high schools (top row of Figure 11), Black/Latinx/Native students comprise less than 20% of enrolled students. Therefore, even if universities visited schools with racial composition on par with the universe of private high schools, most visited schools would have relatively few Black/Latinx/Native students enrolled. Figure 11 shows that for most universities in our sample, the set of visited private high schools enrolled *fewer* Black/Latinx/Native students than the universe of private high schools. For public universities, exceptions to this finding were UC-San Diego, UC-Riverside, and – to a lesser extent – SUNY Stony Brook. For private universities, Marquette was the only exception to this finding.

INSERT FIGURE 11 ABOUT HERE

Several studies suggest that universities – particularly elite private universities – pursue racial diversity by recruiting non-white students who attend predominantly white private high schools (e.g., Jack, 2019). Additionally, scholarship that engages with enrollment in private schools by Black students suggests that many high-income Black families began sending their children to elite, predominantly white private schools once these schools were willing to enroll Black students (Graham, 1999). Therefore, universities may visit predominantly white private high schools in search of non-white students. One concern about this practice is that non-white students at elite private schools may be in high demand by many universities, but similarly achieving non-white students at predominantly non-white public schools might be ignored.

INSERT FIGURE 12 ABOUT HERE

Figure 12 compares the racial composition of private high schools visited by public research universities to the racial composition of public high schools visited by these universities. Looking at the universe of high schools (top rows of Figure 12), we see that public high schools tend to be more racially diverse than private schools. This is reflected in the racial composition of visited schools as well, where the set of visited public high schools generally enroll more Black/Latinx/Native students than the visited private schools for the public research universities in our sample. Unfortunately though, a majority of these public universities tended to visit private high schools at a higher rate than public high schools, as seen earlier in Figure 4. This disproportionate emphasis on private school visits may shift the racial composition of public universities away from Black/Latinx/Native students.



### 5.3 RQ3: Overlapping network structure

Research question 3 asks, “To what extent do public research universities and selective private universities visit overlapping sets of private high schools?” In contrast to RQ1 and RQ2, answering RQ3 requires social network analysis techniques.

Appendix X describes how we constructed social network data. Briefly, we began by constructing a two-mode social network of visits to private high schools (mode 1) by universities (mode 2). Each university and each private high school is a “vertex.” A visit from a university to a school is an “edge.” Because large two-mode networks like our school-university network are difficult to visualize, two-mode networks are often analyzed as one-mode networks (Borgatti, 2008; Davis, Yoo, & Baker, 2003). We transformed our two-mode school-university network into a one-mode university network in which each university is a vertex and two universities share an edge if both universities visited at least one high school in common. The *weight* of an edge indicates the number of high schools that both universities visited. For example, if there are 200 private high schools that received a visit from both Notre Dame and Villanova, the weight of the edge between Notre Dame and Villanova is 200. We created three separate one-mode university networks: a public university network; a private university network; a public and private university network.

We answer research question 3 by: first, analyzing overlap in the recruiting network of public universities (the public university network); second, analyzing overlap in the network of private universities (the private university network); and third, analyzing overlap amongst public and private universities (the public and private university network).

#### 5.3.1 Public university network

Tables 3 and 4 provide a tabular representation of the extent to which public universities visited overlapping sets of private high schools. Table 3 shows – for each pair of public universities – the number of high schools that were visited by both universities. For example, column 1 shows that of the 759 different private high schools that the University of Alabama visited, the University of South Carolina visited 284 of these schools and CU-Boulder visited 210 of these schools. Table 4 shows overlap in high schools visited in terms of percent rather than count. For example, column 2 shows that of the 396 different private high schools visited by the University of South Carolina, the University of Alabama visited 71.7% of these high schools and CU-Boulder visited 39.1% of these high schools.

INSERT TABLE 3 AND TABLE 4 ABOUT HERE

One finding from Table 4 is that the University of Alabama is omnipresent in the set of private high schools visited by most other public research universities in the sample, particularly universities located in the South. For the remaining universities, Table 4 suggests several clusters of universities. For example, UMass-Amherst, SUNY Stony Brook, and Rutgers tend to visit many of the same high schools, as do the University of Arkansas and the University of Kansas.

Network graphs are useful for showing which universities have similar private high school recruiting networks. Figure 13 graphs the one-mode public university network. Whether graphing one-mode or two-mode networks, network graphs show vertices as circles and edges as lines connecting pairs of vertices. In Figure 13, each circle represents a public university and two universities share an edge – represented by a solid line – if both universities visit at least one high school in common. The

width of the line between two universities indicates the number of high schools both universities visited, as identified in Table 3. Conceptually, we think of vertices as repelling one another and edges as pulling vertices together (Kolaczyk & Csárdi, 2020). Therefore, vertices that share few connections are located apart and those that share many connections are located close together. Vertices that are highly connected – many direct and indirect connections to other nodes in the network – are located near the center of the graph, while vertices that are relatively disconnected are located at the periphery of the graph.

INSERT FIGURE 13 ABOUT HERE

Figure 13 shows the University of Alabama, University of South Carolina, and CU-Boulder at the center of the recruiting network. The University of Nebraska-Lincoln, SUNY Stony Brook, and UC-Riverside are located on the periphery, and the remaining universities are in between. Universities that share many direct (i.e., visit many of the same schools) or indirect edges tend to be located close together, for example University of Kansas and University of Arkansas.

To better answer research question 3, we augment the network graphs by using cluster analysis methods – referred to as “community detection” in the network analysis literature – to identify groups of universities that share common network structure. Broadly speaking, the goal of community detection is to identify “subsets of vertices that demonstrate a ‘cohesiveness’ with respect to the underlying relational patterns” (Kolaczyk & Csárdi, 2020, p. 59), where a “cohesive subset” means a “subset of vertices that (i) are well connected among themselves, and at the same time (ii) are relatively well separated from the remaining vertices” (Kolaczyk & Csárdi, 2020, p. 59). In particular, we utilize that “cluster fast and greedy” approach developed by Kolaczyk & Csárdi (2020), which is a variation of hierarchical cluster analysis that starts with a large number of groups and adds individual vertices to a group when doing so contributes to a cohesive subset.

In Figure 13, the shape of each university vertex is based on implementing this cluster fast and greedy approach with the specification that the algorithm should identify four groups. The largest group consists of eight universities (U. Alabama, U. Arkansas, U. Kansas, Nebraska-Lincoln, U. Georgia, U. South Carolina, CU-Boulder, U. Cincinnati). With the exception of CU-Boulder, these universities were located in the South and the Midwest. Most of these universities made a relatively high share of visits in the South. The next largest cluster – UMass Amherst, University of Pittsburgh, Rutgers, and SUNY Stony Brook – consisted of universities that were mostly located in the Northeast and visited a large share of high schools in the Northeast. UC-Berkeley and UC-San Diego formed a two-university cluster and UC-Riverside – which visited fewer private schools than any other public university – was a cluster unto itself.

### 5.3.2 Private university network

Table 5 and Figure 14 show overlap in private high schools visited by the selective private universities in our sample. The networks of private universities tend to have more overlap than the network of public research universities (above). This is demonstrated tabularly by the higher percentages in Table 5 compared to Table 4 and graphically by the thicker lines connecting universities in Figure 14 compared to Figure 13.

INSERT TABLE 5 ABOUT HERE

INSERT FIGURE 14 ABOUT HERE



Whereas applying cluster analysis to public universities (Figure 13) yielded three clusters that contained multiple universities, the application of cluster analysis to private universities (Figure 14) yielded a single cluster that contained 11 universities and three clusters that contained one university each. As suggested above, a likely explanation for this difference is that the majority of private universities had substantial overlap in the sets of private high schools visited whereas public universities tended to have substantial overlap with some public universities but not others.

Visually, the most central universities in Figure 14 tended to be universities that visited a large number of schools (number of unique private high schools visited in parentheses): Villanova (563), SMU (550), Notre Dame (625), Northwestern (377), Tulane (430), Boston College (339). The periphery of the network included Baylor (237), Stevens Institute (160), Marquette (331), and Case Western (228). Baylor visited a higher number of conservative Christian high schools than any other university (see Figure 7). It is notable that Marquette is in the periphery despite visiting a higher number of schools than more centrally located universities (e.g., Emory), suggesting that Marquette visits many schools that are visited by few other private universities in our sample.

The universities located close to one another in Figure 14 tend to share religious affiliation and/or be located in the same geographic region. For example, the majority of Catholic universities are located close to one another and the majority of Midwest universities are located close to one another. Interestingly, two of the three Christian universities – TCU and SMU – are located much closer to the Catholic universities Notre Dame and Northwestern than they are to Baylor, suggesting that Baylor visits a different set of conservative Christian high schools than TCU and SMU.

### 5.3.3 Public and private university network

Figure 15 shows overlap in private high schools visited amongst all 29 private and public universities in the sample.

The allocation of universities to clusters appears to be correlated with the characteristics – university characteristics and characteristics of the schools they visit – of geographic location, religious affiliation, academic reputation, and also institutional control. The cluster of 10 universities – including the University of Alabama, TCU, SMU, Baylor, and the University of South Carolina – largely consists of universities in the South, and includes both private Christian universities and public universities that visited a relatively large share of Christian high schools. Second, the cluster of 13 universities – including Notre Dame, Northwestern, Tulane, CU-Boulder, UC-Berkeley – largely consists of more highly ranked universities, universities located in the Midwest or West, and Catholic universities. Third, the five university cluster – Rutgers, Stevens Institute of Technology, UMass Amherst, University of Pittsburgh, SUNY Stony Brook – largely consists of public universities with strong ties to the Northeast.

INSERT FIGURE 15 ABOUT HERE

Universities located near the center of Figure 15 do not all belong to the same cluster and, more broadly, universities located close to one another do not all belong to the same cluster. Universities located near the center of Figure 15 tended to be universities with the highest degree centrality (i.e., those that visited the most schools). The top nine universities in terms of degree centrality are (number of unique private high schools visited in parentheses): University of Alabama (759), Notre Dame (625), Villanova (563), SMU (550), TCU (435), Tulane (430), Northwestern (377), University of South Carolina (396), and CU-Boulder (362). Notably, while the majority of universities located

near the center of Figure 15 are private, three are public.

Proximity of vertices to one another in Figure 15 appeared to be more connected to religious affiliation, geographic location, and academic reputation. Universities with a common religious affiliation (e.g., Notre Dame, Villanova, Marquette, Boston College) tend to be close to one another. However, the University of Alabama, which visited a high share of Catholic schools and Christian schools is simultaneously close to Catholic universities and to the Christian universities TCU and SMU. Similarly, the University of South Carolina, which visited a relatively high share of Christian schools, is close to TCU and SMU. CU-Boulder, Emory, and Northwestern – three universities that differ from one another with respect to geographic location, religious affiliation, and institutional control – are located close to one another in Figure 15. These three universities are similar to one another with respect to the geographic location (Figure 6), religious affiliation (Figure 7), and academic reputation (Figure 8) of the private high schools they visit.

Finally, Table 6 shows, for each private university, the percent of schools that were also visited by each public university. This table shows the extent to which public universities were competing at private schools targeted by private universities. For example, of the 625 private schools visited by Notre Dame, the University of Alabama visited 52.5% of these schools. Similarly, CU-Boulder visited 46.4 of the 435 schools that TCU visited and 42.4% of the 377 schools that Northwestern visited. The University of Arkansas competed heavily at schools visited by Baylor; Rutgers and UMass Amherst competed heavily at schools visited by Stevens Institute of Technology; and UC-Berkeley competed at schools visited by Northwestern, Tufts, and Emory.

INSERT TABLE 6 ABOUT HERE

These analyses of the private and public university network provide the most direct assessment of research question 3. Considering the identification of clusters, centrality, and proximity of vertices, we find substantial overlap in the sets of private schools visited by public universities and private universities. This overlap does not suggest uniformity across public and private universities. Rather, there exist several groups of public and private universities – which can be defined by cluster analysis or more loosely by proximity – that have more in common with one another than they do with other universities of the same institutional control.

## 6 Discussion

### 6.1 Summary

This chapter analyzes recruiting visits to private high schools, which were made during the 2017 calendar year, for a convenience sample of 15 public research universities and 14 private universities ranked in the top 100 of U.S. News and World Report National Universities rankings. Our goal was to learn about public research universities by analyzing their behavior and comparing their behavior to that of selective private universities.

Research question 1 asks about the scale of visits to private high schools. All private universities in our sample made a disproportionate number of visits to private high schools (Figure 5) and, for about half of these universities, visits to private high schools represented about 50% or more of all high school visits. For most public research universities in our sample, the scale and relative scale – as a percentage of all HS visits – of visits to private high schools were smaller than that of most selective private universities. However, 13 of the 15 public universities visited a disproportionate

number of private high schools (Figure 4) and that vast majority of these private school visits were to out-of-state private schools. Additionally, several public research universities – University of Alabama, CU-Boulder, University of South Carolina – visited private high schools at a scale that exceeded most private universities.

Research question 2 asks about the characteristics of visited private high schools. We analyzed geographic region, religious affiliation, high school ranking, 12th grade enrollment, and racial composition. Both public and private universities in our sample tended to make a disproportionate number of visits in their home geographic region, with highly ranked universities making more visits to schools in other regions. The majority of universities – even those located outside the South – visited a large number of private schools located in the South. Unsurprisingly, sectarian private universities made a large share of visits to private high schools of a similar religious affiliation. Given that public universities are nonsectarian organizations, a surprising finding is that the majority of public universities in our sample made a large share of visits to Catholic or Christian private schools.

With the exception of UC-Berkeley and UC-San Diego, the academic rating of private schools visited by public universities was lower than the rating of those visited by most private universities. This finding is largely explained by our analysis sample, which included public research universities regardless of rank but only included private universities ranked as a top 100 National University by U.S. News. Nevertheless, the large number of visits to low-rated private schools by public universities, combined with the fact that the overwhelming majority of these visits were to out-of-state schools, is consistent with the idea that many public flagship universities visit private schools primarily in search of full-pay students rather than academic superstars.

Across the universe of private high schools, most schools enroll relatively few students who identify as Black, Latinx, or Native. For the public and private universities in our sample, the set of visited private schools enrolled fewer Black, Latinx, and Native students than the national universe of private schools. By contrast, the public high schools visited by public universities tended to enroll a much higher share of students who identify as Black, Latinx, or Native.

Research question 3 asks about overlap in the private school recruiting networks of public and private universities. Within the sample of public universities, we observed substantial overlap and variation in recruiting networks. For example, the recruiting networks of the University of Arkansas and the University of Kansas share substantial overlap and are very different from the recruiting networks of UMass Amherst and Rutgers, which share substantial overlap with one another. Across the entire sample of public and private universities, we also observed substantial overlap and variation in recruiting networks. Whether we are categorizing universities by cluster analysis or by proximity on the network graph, we observe several different subsets of universities. Each of these subsets is associated with a different approach to private school visits and – with the exception of a few universities like UC-Riverside and SUNY Stony Brook – each of these subsets contained both public and private universities.

## 6.2 Privatization of public research universities

These findings contribute new insights about the privatization of public research universities. A weakness of the scholarly literature on privatization is that few studies compare public and private universities with respect to a behavior that is associated with private universities (McClure, Barringer, & Brown, 2019). We conceptualize recruiting visits to private schools as a behavior that is consistent

with the social reproduction orientation of selective private universities and contrary to the historic social mobility mission associated with public research universities. Although we cannot make statements about the population of public research universities (ours is a convenience sample rather than a random sample), we can describe variation in how the public universities in our sample went about visiting private schools.

At one end of the continuum lie public research universities that do not play the game, for example UC-Riverside and SUNY Stony Brook, visiting private schools at a lower rate than public schools (Figure 4). For public universities that visited a substantial number of private schools, we observe substantial variation in the scale of visits and the characteristics of schools they target. While all private universities in our sample visited private schools at a much higher rate than public schools, we also see substantial variation amongst private universities in the scale and characteristics of private school visits. Amongst the network of public and private universities, Figure 15 shows that three clusters emerge – each containing some mix of public and private universities. The universities within a cluster have some overlap in the kinds of schools visited (e.g., TCU and University of South Carolina), but also share substantial overlap with particular universities in different clusters (e.g., Tufts and University of Pittsburgh).

In making large-scale visits to out-of-state private high schools, we argue that public research universities are mimicking the behavior of selective private universities in order to compete for students that have been traditionally targeted by private universities. Our rationale for this statement is that selective private universities have been recruiting heavily from private schools for a long time (Falsey & Heyns, 1984; Khan, 2011; Kingston & Lewis, 1990). By contrast, the pursuit of out-of-state students is a relatively new phenomenon for most public research universities.

When making decisions about which private schools to visit, public research universities seem to be mimicking the behavior of particular private universities rather than mimicking the behavior of private universities writ large. Several public universities seem to be competing directly for students targeted by a particular private university. For example, UC-Berkeley visited 27.9% of the schools visited by Northwestern, 28.9% of the schools visited by Tufts, and 27.8% of the schools visited by Emory (Figure 6). We reason UC-Berkeley is competing directly for students because all four universities are in the same broad echelon of prestige. Other potential examples of direct competition include the University of Georgia targeting schools visited by Emory, SMU, TCU, and Tulane, or the University of Arkansas targeting schools visited by Baylor.

However, public universities that made the greatest number of private school visits seemed to be targeting lower-achieving students at private schools targeted by particular private universities. For example, the University of Alabama visited 52.2% of the 625 private schools that Notre Dame visited, with most of the overlap at Catholic schools. Given the differences in academic prestige between them, the University of Alabama may not be competing for the same students as Notre Dame. Instead, they found a niche by targeting Catholic school students of a similar economic echelon, who have lower academic achievement, and want to attend a football powerhouse. Additionally, CU-Boulder visited 42.4% of schools visited by Northwestern, which could be interpreted as CU-Boulder competing for lower-achieving students of a similar economic and cultural echelon at the schools targeted by Northwestern. Similarly, the University of South Carolina competes heavily at schools targeted by Emory, SMU, TCU, and Tulane.

Finally, all public universities that visited a substantial number of private schools tended to visit schools that enrolled few Black, Latinx, or Native students. This finding is substantially driven by the fact that the national universe of private schools tends to enroll a much lower share of Black,

Latinx, or Native students than the universe of public schools. However, the set of schools visited by the public universities in our sample enrolled fewer Black, Latinx, and Native students than the universe of private schools. Although we do not have data on household income, it is likely that the majority of students are wealthy at the private schools visited by public universities in our sample.

Therefore, while public universities playing the private school game differ in terms of the set of schools they target, they all seem to be targeting schools that enroll mostly affluent students and few students who identify as Black, Latinx, or Native. To the extent that these recruiting efforts yield dividends in terms of incoming freshmen, playing the private school game is likely to change the enrollment composition of public research universities in ways that run contrary to racial and socioeconomic diversity.

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## 8 Social network data appendix

A social network consists of a set of actors – referred to as “vertices” – and the connections – referred to as “network ties” or “edges” between these actors. “One-mode” networks consist of vertices of a “type.” For example, the social network of Facebook consists of users (vertices) who are connected to one another via friendship ties (edges). “Two-mode” networks consist of vertices associated with one type of actor/entity having connections to vertices of another type. Data on recruiting visits by universities to high schools yields a two-mode network, in which an edge – a recruiting visit – occurs between a high school (mode 1) and a university (mode 2).

**Constructing two-mode network.** We describe construction of social network data with reference to “corporate board-director” networks – the most commonly analyzed two-mode network – which consist of directors (mode 1) who serve on organizational boards (mode 2). In our school-university two-mode network, the vertices are private high schools (mode 1) and universities (mode 2), and an edge is defined as an off-campus recruiting visit made between the two (e.g., high school  $i$  shares an edge with university  $j$  if high school  $i$  receives at least one visit from university  $j$ ). Visits can only occur between a school-university pair (not a school-school pair or a university-university pair). This (weighted) network can be represented as a school-by-university matrix (e.g., a  $500 \times 40$  matrix if our network contains 500 high schools and 40 universities) in which matrix cell  $a_{i,j}$  identifies the number of visits high school  $i$  received from university  $j$ .

**Transforming two-mode network to one-mode networks.** Two-mode networks are often analyzed as one-mode networks (Borgatti, 2008). Davis, Yoo, & Baker (2003) states that “overlapping groups such as boards of directors form a two-mode membership network in which one can conceive of directors as nodes [vertices] connected by a tie of common board membership, or boards as nodes connected by a tie of one or more shared directors” (p. XXX). Thus, a two-mode board-director network can be transformed into two one-mode networks. A weighted one-mode director network can be created as follows: create a director-by-director matrix (e.g., a  $100 \times 100$  matrix if there are 100 directors in the network); two directors share an edge if they serve together on a board; matrix cell  $a_{i,j}$  identifies the number of boards that include both director  $i$  and director  $j$  (e.g.,  $a_{i,j} = 0$  if directors  $i$  and  $j$  do not serve on any of the same boards and  $a_{i,j} = 3$  if directors  $i$  and  $j$  serve on three boards together). Similarly, a one-mode board network is created based on a board-by-board matrix in which two boards share an edge if a director sits on both boards and matrix cell  $a_{i,j}$  identifies the number of directors that serve on both board  $i$  and board  $j$ .

Following this approach, we create a one-mode high school network in which two private high schools share an edge if they both receive a visit by the same university. Cell  $s_{i,j}$  of the school-by-school matrix  $S$  indicates the number of universities that visited both school  $i$  and school  $j$ . Similarly, we create a one-mode university network in which two universities share an edge if both universities visited the same high school. Cell  $c_{i,j}$  of the university-by-university matrix  $C$  indicates the number of private high schools that received at least one visit from both university  $i$  and university  $j$ .

The social network analyses presented in this chapter – particularly for research question 3 – are primarily based on analysis of one-mode university networks. We created separate one-mode university networks for: public universities; private universities; both public and private universities.

Table 1: Percentage of budget allocated to marketing/recruiting activities by private non-profit 4yr and public 4yr institutions

Activity	Private	Public
Travel	17	16
Student search (purchased lists)	14	12
Prospective student communications	13	17
Events	12	11
Recruitment publications	11	15
Web services and digital advertising	11	13
Traditional advertising	6	6
International recruitment	5	3
Transfer recruitment	4	4
Other	8	3

Table 2: Characteristics of universities in analysis sample

classification	univ_abbrev	rank	satactcomp25	satactcomp75	tfuginst	tfugoutst	ugftptfreshot	freshoutstpct	pgrnt_p	ptcfreshwh	ptcfreshhl	ptcfreshap	ptcfreshhi	ptcfreshal
public_research	UC Berkeley	22	1315.8741	1527.489	13806.628	41076.48	6252	0.2436021	19.448523	25.62380	1.759437	42.722329	13.819578	9.2930262
	UC San Diego	35	1192.6296	1454.526	13945.624	41215.48	5748	0.2649617	30.731537	15.46625	1.513570	34.446764	20.633264	21.6249130
	U of Georgia	47	1164.7026	1359.762	11890.318	30501.52	5433	0.1233204	20.329569	67.95509	8.098656	12.350451	5.761090	1.6197313
	U of Pitt	58	1201.5671	1395.423	19028.189	30413.62	5644	0.3061658	20.273389	68.46208	7.317505	9.337349	4.323175	3.5790220
	Rutgers	63	1110.0000	1350.000	14688.642	30684.46	6465	0.1780356	26.996904	35.45244	5.955143	31.291570	12.126837	10.3789637
	UMass Amherst	66	1134.9703	1332.485	15300.839	32913.51	4679	0.2690746	21.511130	61.01731	3.782860	12.502671	6.026929	8.1213935
	UC Riverside	88	956.4182	1199.851	13880.214	41150.07	5358	0.0222098	56.594949	10.13438	4.012691	31.093692	47.200448	2.5009332
	SUNY Stony Brook	88	1162.5096	1373.127	9197.265	26817.09	2934	0.2583504	34.561583	27.84594	5.896387	28.766189	11.042945	16.4621677
	CU Boulder	103	1126.4928	1331.185	11785.049	35851.86	6421	0.4720449	14.565695	66.28251	1.479520	5.622177	12.536988	7.4754711
	U of S.Carolina	118	1135.3982	1320.531	11706.353	31562.39	5110	0.5320939	15.435847	82.09393	4.990215	3.033268	4.266145	1.2133072
	U of Kansas	124	1070.0000	1300.000	10781.414	26503.33	4233	0.4275927	23.438257	72.10017	4.299551	4.535790	8.669974	4.6302858
	UNL	133	1026.9377	1261.531	8725.086	23557.83	4860	0.2993827	23.856818	75.57613	3.065844	2.530864	7.242798	6.2962963
	U of Alabama	143	1052.5409	1350.901	10700.673	27543.76	7559	0.6809102	16.986155	80.55298	7.977246	1.270009	5.304934	0.7805265
	U of Cincinnati	143	1063.2927	1265.030	11242.350	26914.19	6913	0.1306235	26.655579	74.85896	9.012006	3.833357	3.515116	2.4157385
	U of Arkansas	160	1057.2655	1283.021	9014.320	23678.43	4972	0.5102574	19.501823	78.70072	3.921963	2.614642	8.487530	1.0458568
private_national	Northwestern	9	1413.0637	1527.341	51975.430	51975.43	1985	0.6977330	17.783375	46.14610	5.037783	16.725441	13.602015	9.6725441
	Notre Dame	19	1395.1492	1552.900	50779.652	50779.65	2046	0.9447703	11.876833	67.79081	4.496579	5.327468	10.654936	5.8651026
	Emory	21	1313.4745	1481.220	49010.516	49010.52	1358	0.8549337	17.452136	40.94256	7.142857	18.777614	10.824742	16.1266568
	Tufts	30	1375.1345	1514.865	53585.129	53585.13	1336	0.8023952	10.209993	54.86527	4.790419	13.398204	6.661677	11.3772455
	Boston Coll.	35	1296.5361	1460.000	52426.145	52426.14	2254	0.7657498	12.840467	61.35759	2.795031	10.692103	11.135759	6.8322981
	Tulane	41	1276.5323	1416.089	52133.844	52133.84	1856	0.8760776	7.758621	75.96983	4.256466	5.711207	5.818966	4.2564655
	Case Western Res.	42	1314.1865	1501.396	47019.598	47019.60	1265	0.7573122	9.968354	48.14229	4.268775	19.604743	6.245059	15.5731225
	Villanova	53	1279.7854	1420.000	50365.727	50365.73	1678	0.8313469	9.725537	76.04291	4.707986	5.542312	6.853397	1.4898689
	SMU	66	1244.0140	1416.004	51467.480	51467.48	1522	0.6156373	10.190664	66.42576	5.584757	5.913272	11.038108	6.3074901
	Baylor	76	1163.3229	1328.567	42931.469	42931.47	3503	0.3531259	17.362700	65.40108	6.166143	5.538110	15.272623	2.9403369
	U of Denver	80	1165.7943	1358.820	47444.762	47444.76	1399	0.6754825	14.596950	73.48106	2.001430	4.288778	9.792709	5.5754110
	TCU	80	1124.5416	1320.906	43610.098	43610.10	1888	0.5662076	11.234764	72.88136	4.661017	3.125000	13.294491	3.6546610
	Stevens Ins. Tech	80	1273.6338	1446.817	49913.988	49913.99	737	0.3880597	15.468114	65.40027	2.713704	14.654003	10.040706	4.6132972
	Marquette	88	1101.1530	1296.208	39317.562	39317.56	2005	0.7142144	18.981019	68.02993	4.887780	8.129676	13.316708	2.4937656
private_libarts	Williams	1	1350.9877	1527.407	52931.027	52931.03	553	0.8788427	21.157324	53.70705	7.775768	13.381555	13.019891	7.4141049
	Swarthmore	3	1319.6681	1521.618	50185.852	50185.85	415	0.9084337	19.277108	42.40964	7.710843	13.975904	13.493976	12.0481928
	Middlebury	9	1310.1361	1477.421	51165.980	51165.98	606	0.9554455	13.201320	62.87129	4.125413	6.435644	10.066007	9.2409241
	Smith	15	NA	NA	48959.414	48959.41	654	0.8654434	19.113150	47.09480	7.492355	9.633028	11.009174	13.9143731
	Harvey Mudd	25	1420.0000	1571.032	53826.328	53826.33	214	0.6261683	13.425926	34.11215	3.271028	17.757009	21.962617	5.1401869
	Colorado Coll.	25	NA	NA	52013.242	52013.24	533	0.8724203	8.067542	63.78987	2.814259	4.127580	9.193246	10.1313321
	Macalester	27	1282.4338	1473.175	51754.668	51754.67	506	0.8616601	15.612648	60.47431	3.359684	8.498024	7.312253	15.0197628
	Scripps	28	1275.1476	1430.098	52105.227	52105.23	270	0.5962963	12.222222	58.51852	5.185185	17.777778	10.370370	4.4444444
	Oberlin	36	1273.7423	1454.748	53147.699	53147.70	762	0.9317585	10.761155	62.59843	4.986877	5.249344	7.217848	10.7611549
	Occidental	40	1228.1915	1401.206	52195.164	52195.16	502	0.6135458	20.119522	50.19920	6.374502	14.741036	12.151394	7.7689243
	Sewanee	47	NA	NA	39671.188	39671.19	514	0.8307393	16.926070	82.10117	4.669261	1.556420	5.252918	3.5019455
	Conn Coll.	51	NA	NA	52062.301	52062.30	472	0.8665254	17.372881	67.58475	3.389830	5.084746	10.169491	8.0508475

Table 3: One-mode public university count matrix

	U of Alabama (N=759)	U of S.Carolina (N=396)	CU Boulder (N=362)	UMass Amherst (N=296)	U of Georgia (N=256)	Rutgers (N=255)	U of Cincinnati (N=243)	U of Pitt (N=222)	UC Berkeley (N=200)	UC San Diego (N=192)	U of Kansas (N=173)	U of Arkansas (N=163)	SUNY Stony Brook (N=119)	UNL (N=100)	UC Riverside (N=88)
U of Alabama (N=759)	759	284	210	149	169	120	124	125	112	100	93	100	43	31	34
U of S.Carolina (N=396)	284	396	155	108	140	74	110	99	84	59	58	57	27	20	19
CU Boulder (N=362)	210	155	362	115	88	76	69	92	77	98	74	51	21	25	28
UMass Amherst (N=296)	149	108	115	296	57	93	27	56	45	57	18	14	57	4	18
U of Georgia (N=256)	169	140	88	57	256	24	73	48	64	38	39	59	7	13	16
Rutgers (N=255)	120	74	76	93	24	255	35	74	41	43	20	5	48	10	10
U of Cincinnati (N=243)	124	110	69	27	73	35	243	56	33	24	29	37	5	18	8
U of Pitt (N=222)	125	99	92	56	48	74	56	222	41	28	32	26	27	15	11
UC Berkeley (N=200)	112	84	77	45	64	41	33	41	200	61	30	26	9	8	20
UC San Diego (N=192)	100	59	98	57	38	43	24	28	61	192	29	22	11	3	35
U of Kansas (N=173)	93	58	74	18	39	20	29	32	30	29	173	62	0	61	8
U of Arkansas (N=163)	100	57	51	14	59	5	37	26	26	22	62	163	1	24	9
SUNY Stony Brook (N=119)	43	27	21	57	7	48	5	27	9	11	0	1	119	0	4
UNL (N=100)	31	20	25	4	13	10	18	15	8	3	61	24	0	100	0
UC Riverside (N=88)	34	19	28	18	16	10	8	11	20	35	8	9	4	0	88

Table 4: One-mode public university percent matrix

	U of Alabama (N=759)	U of S.Carolina (N=396)	CU Boulder (N=362)	UMass Amherst (N=296)	U of Georgia (N=256)	Rutgers (N=255)	U of Cincinnati (N=243)	U of Pitt (N=222)	UC Berkeley (N=200)	UC San Diego (N=192)	U of Kansas (N=173)	U of Arkansas (N=163)	SUNY Stony Brook (N=119)	UNL (N=100)	UC Riverside (N=88)
U of Alabama (N=759)	100.0	71.7	58.0	50.3	66.0	47.1	51.0	56.3	56.0	52.1	53.8	61.3	36.1	31	38.6
U of S.Carolina (N=396)	37.4	100.0	42.8	36.5	54.7	29.0	45.3	44.6	42.0	30.7	33.5	35.0	22.7	20	21.6
CU Boulder (N=362)	27.7	39.1	100.0	38.9	34.4	29.8	28.4	41.4	38.5	51.0	42.8	31.3	17.6	25	31.8
UMass Amherst (N=296)	19.6	27.3	31.8	100.0	22.3	36.5	11.1	25.2	22.5	29.7	10.4	8.6	47.9	4	20.5
U of Georgia (N=256)	22.3	35.4	24.3	19.3	100.0	9.4	30.0	21.6	32.0	19.8	22.5	36.2	5.9	13	18.2
Rutgers (N=255)	15.8	18.7	21.0	31.4	9.4	100.0	14.4	33.3	20.5	22.4	11.6	3.1	40.3	10	11.4
U of Cincinnati (N=243)	16.3	27.8	19.1	9.1	28.5	13.7	100.0	25.2	16.5	12.5	16.8	22.7	4.2	18	9.1
U of Pitt (N=222)	16.5	25.0	25.4	18.9	18.8	29.0	23.0	100.0	20.5	14.6	18.5	16.0	22.7	15	12.5
UC Berkeley (N=200)	14.8	21.2	21.3	15.2	25.0	16.1	13.6	18.5	100.0	31.8	17.3	16.0	7.6	8	22.7
UC San Diego (N=192)	13.2	14.9	27.1	19.3	14.8	16.9	9.9	12.6	30.5	100.0	16.8	13.5	9.2	3	39.8
U of Kansas (N=173)	12.3	14.6	20.4	6.1	15.2	7.8	11.9	14.4	15.0	15.1	100.0	38.0	0.0	61	9.1
U of Arkansas (N=163)	13.2	14.4	14.1	4.7	23.0	2.0	15.2	11.7	13.0	11.5	35.8	100.0	0.8	24	10.2
SUNY Stony Brook (N=119)	5.7	6.8	5.8	19.3	2.7	18.8	2.1	12.2	4.5	5.7	0.0	0.6	100.0	0	4.5
UNL (N=100)	4.1	5.1	6.9	1.4	5.1	3.9	7.4	6.8	4.0	1.6	35.3	14.7	0.0	100	0.0
UC Riverside (N=88)	4.5	4.8	7.7	6.1	6.2	3.9	3.3	5.0	10.0	18.2	4.6	5.5	3.4	0	100.0

Table 5: One-mode private university percent matrix

	Notre Dame (N=625)	Villanova (N=563)	SMU (N=550)	TCU (N=435)	Tulane (N=430)	Northwestern (N=377)	Boston Coll. (N=339)	Marquette (N=331)	Tufts (N=301)	U of Denver (N=279)	Emory (N=273)	Baylor (N=237)	Case Western Res. (N=228)	Stevens Ins. Tech (N=160)
Notre Dame (N=625)	100.0	60.0	53.3	58.2	51.9	59.4	69.3	69.8	58.8	58.8	53.1	41.8	58.3	49.4
Villanova (N=563)	54.1	100.0	52.9	51.5	50.7	56.8	61.4	61.9	53.5	51.3	53.8	42.6	62.3	64.4
SMU (N=550)	46.9	51.7	100.0	66.7	64.0	64.5	64.3	45.6	62.8	63.4	64.5	65.0	58.8	55.0
TCU (N=435)	40.5	39.8	52.7	100.0	46.3	46.9	49.6	45.3	46.8	54.1	44.7	56.1	43.0	41.2
Tulane (N=430)	35.7	38.7	50.0	45.7	100.0	58.1	51.0	31.1	63.1	50.9	52.4	33.3	57.5	35.0
Northwestern (N=377)	35.8	38.0	44.2	40.7	50.9	100.0	50.7	34.4	56.1	49.8	46.9	31.6	53.5	34.4
Boston Coll. (N=339)	37.6	36.9	39.6	38.6	40.2	45.6	100.0	40.2	52.5	48.4	41.4	27.0	43.9	37.5
Marquette (N=331)	37.0	36.4	27.5	34.5	24.0	30.2	39.2	100.0	25.6	34.8	19.0	26.2	28.9	26.9
Tufts (N=301)	28.3	28.6	34.4	32.4	44.2	44.8	46.6	23.3	100.0	40.9	42.9	21.9	47.4	41.2
U of Denver (N=279)	26.2	25.4	32.2	34.7	33.0	36.9	39.8	29.3	37.9	100.0	30.0	24.1	31.6	27.5
Emory (N=273)	23.2	26.1	32.0	28.0	33.3	34.0	33.3	15.7	38.9	29.4	100.0	16.5	43.0	26.2
Baylor (N=237)	15.8	17.9	28.0	30.6	18.4	19.9	18.9	18.7	17.3	20.4	14.3	100.0	21.9	14.4
Case Western Res. (N=228)	21.3	25.2	24.4	22.5	30.5	32.4	29.5	19.9	35.9	25.8	35.9	21.1	100.0	25.6
Stevens Ins. Tech (N=160)	12.6	18.3	16.0	15.2	13.0	14.6	17.7	13.0	21.9	15.8	15.4	9.7	18.0	100.0

Table 6: For private universities, the percent of high schools visited by public universities

	Notre Dame (N=625)	Villanova (N=563)	SMU (N=550)	TCU (N=435)	Tulane (N=430)	Northwestern (N=377)	Boston Coll. (N=339)	Marquette (N=331)	Tufts (N=301)	U of Denver (N=279)	Emory (N=273)	Baylor (N=237)	Case Western Res. (N=228)	Stevens Ins. Tech (N=160)
U of Alabama (N=759)	52.2	51.0	56.9	59.8	51.2	48.8	54.9	53.5	46.5	48.7	60.1	57.8	53.5	48.8
U of S.Carolina (N=396)	30.7	36.2	40.5	43.9	37.0	36.1	35.7	31.1	35.2	35.5	44.0	38.8	34.6	36.9
CU Boulder (N=362)	34.4	33.2	40.2	46.4	41.4	42.4	42.2	40.5	46.2	49.8	38.1	42.2	42.5	35.0
UMass Amherst (N=296)	21.0	24.3	22.7	24.8	26.5	21.5	33.0	21.1	31.9	27.2	20.1	9.3	17.1	41.2
U of Georgia (N=256)	17.9	22.7	28.4	27.8	27.7	27.3	21.8	13.3	23.6	17.2	32.2	32.5	20.2	20.0
Rutgers (N=255)	19.0	22.9	14.0	16.8	15.8	16.4	20.4	16.9	17.3	16.5	17.2	7.6	20.2	41.9
U of Cincinnati (N=243)	17.3	21.7	18.7	19.3	16.7	22.8	16.8	22.4	14.0	20.4	22.0	17.3	18.0	15.6
U of Pitt (N=222)	20.5	27.5	18.0	18.9	19.1	19.6	20.1	19.0	21.3	15.8	17.2	15.6	27.2	30.6
UC Berkeley (N=200)	16.3	19.0	21.1	21.4	24.4	27.9	21.8	13.9	28.9	19.7	27.8	16.0	27.2	17.5
UC San Diego (N=192)	17.1	14.4	18.2	22.3	17.4	22.0	25.4	17.5	28.9	25.4	18.3	18.1	21.9	20.6
U of Kansas (N=173)	14.4	15.1	16.2	20.7	13.5	17.0	15.0	27.2	12.0	24.7	10.3	23.2	16.2	7.5
U of Arkansas (N=163)	8.8	11.5	19.6	19.8	15.8	13.3	9.4	13.6	10.0	14.3	10.6	35.4	15.4	8.1
SUNY Stony Brook (N=119)	8.0	10.7	5.8	7.4	5.6	4.0	6.8	8.5	8.6	5.0	3.7	0.4	7.9	21.9
UNL (N=100)	6.9	8.2	7.1	8.5	5.1	8.2	6.2	12.7	4.7	9.7	2.9	8.9	7.0	1.9
UC Riverside (N=88)	5.6	5.0	4.9	6.7	5.6	7.4	6.8	5.1	8.0	6.1	4.0	7.6	6.6	3.8

Figure 1: The enrollment funnel



Figure 2: Number of visits to public and private high schools by public research universities

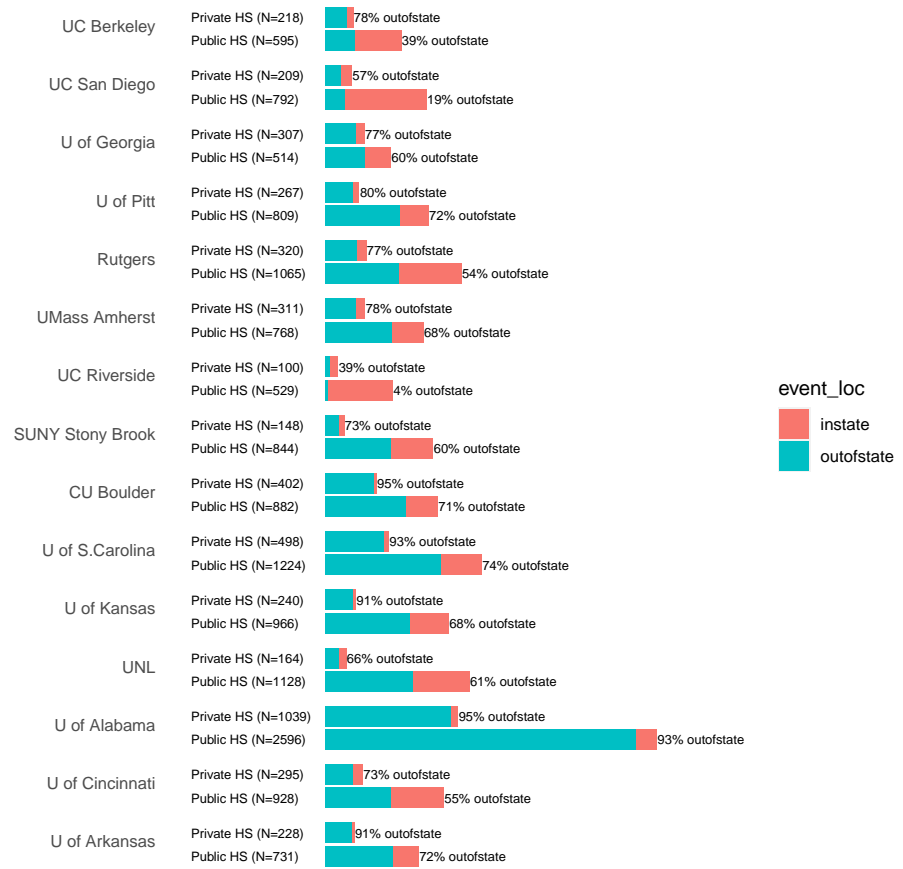




Figure 3: Number of visits to public and private high schools by selective private universities

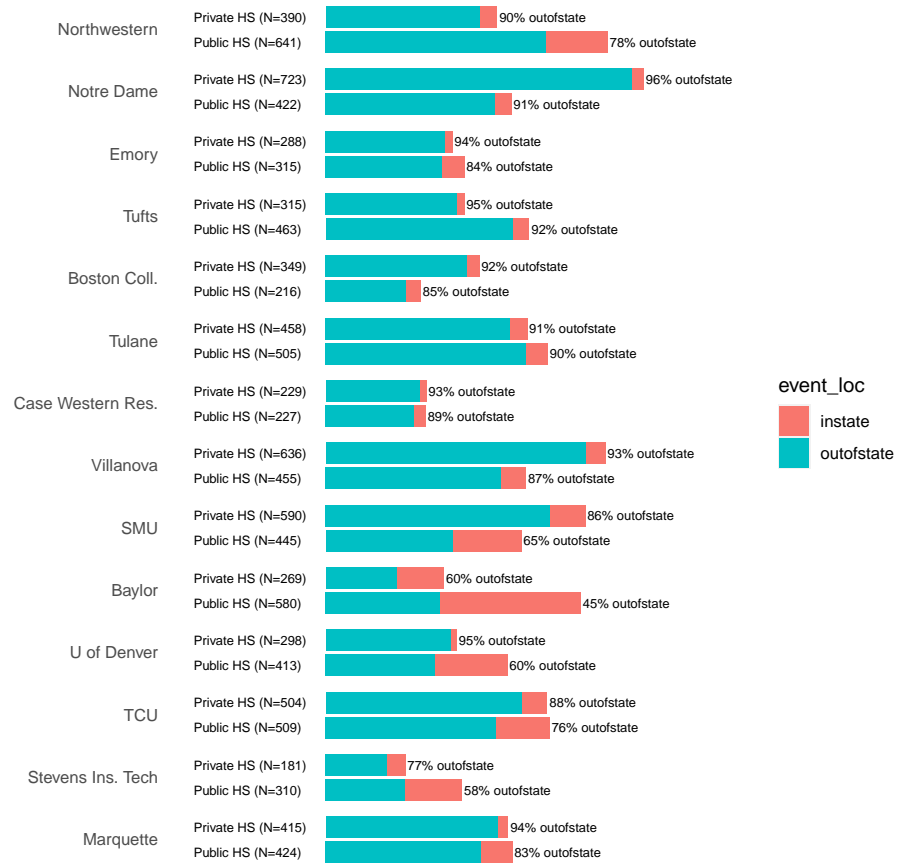


Figure 4: Actual versus proportional number of private school visits, public research universities



Figure 5: Actual versus proportional number of private school visits, selective private universities

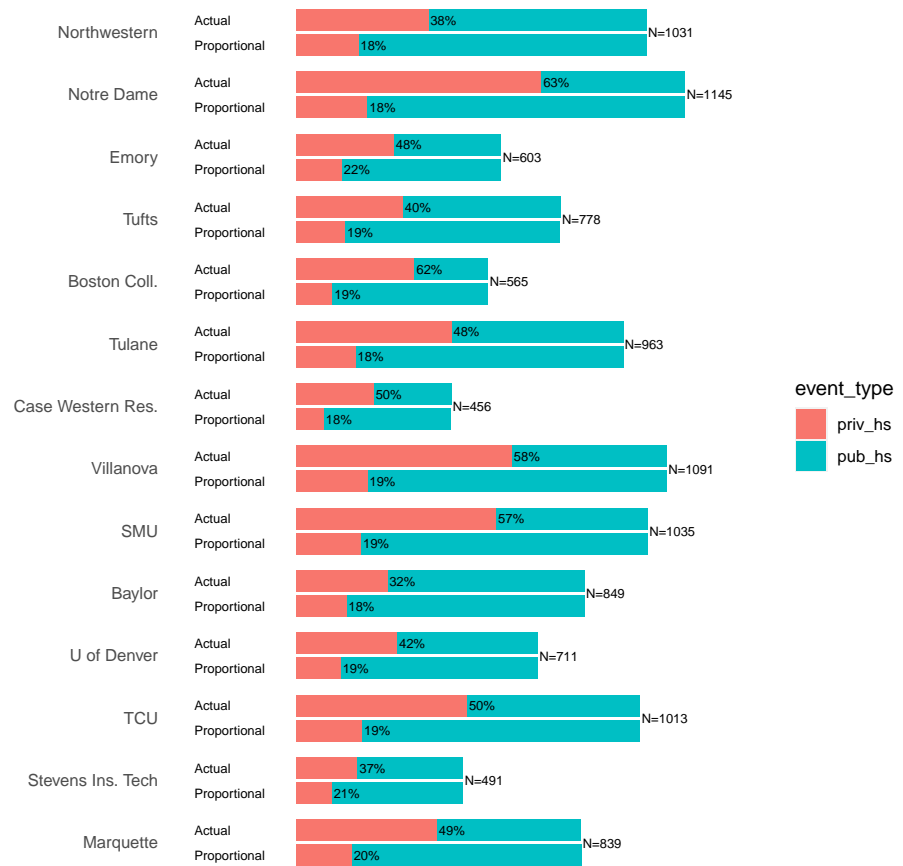


Figure 6: Geographic region of visited private high schools

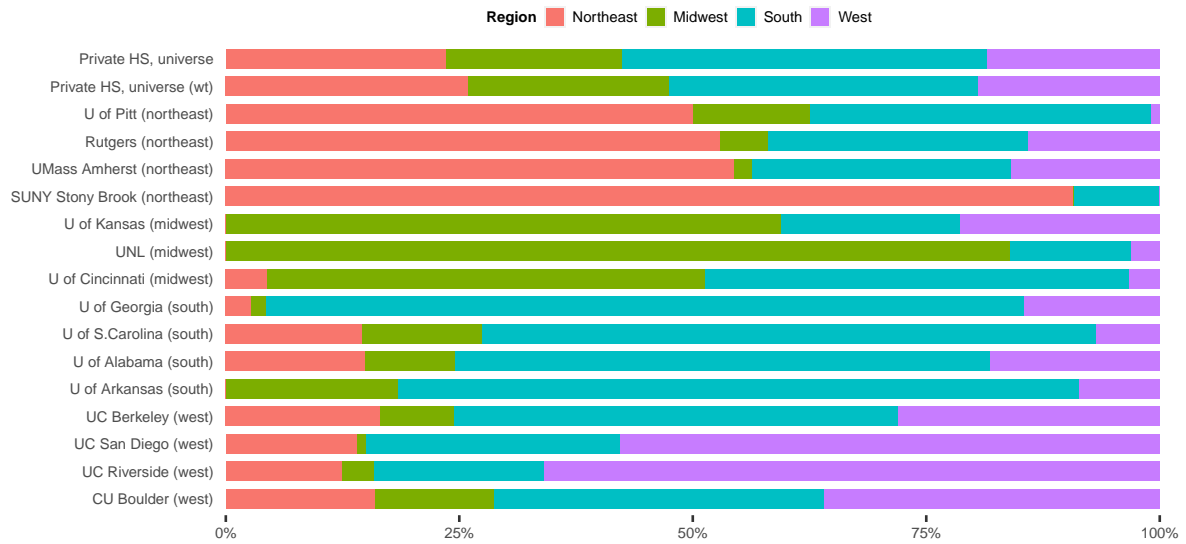


Figure 7: Religious affiliation of visited private high schools



Figure 8: High school ranking of visited private high schools

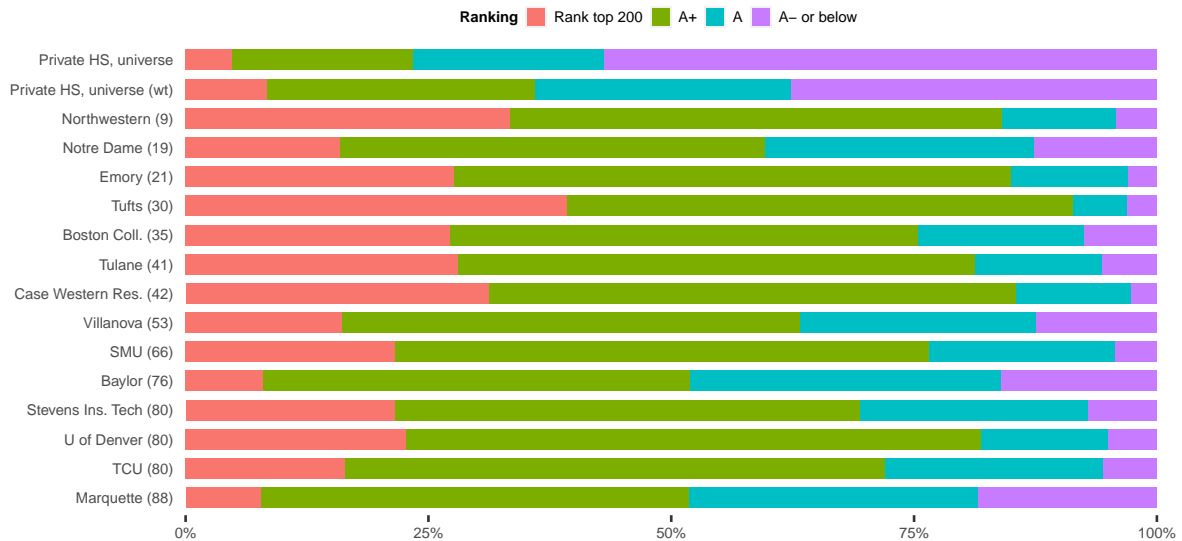
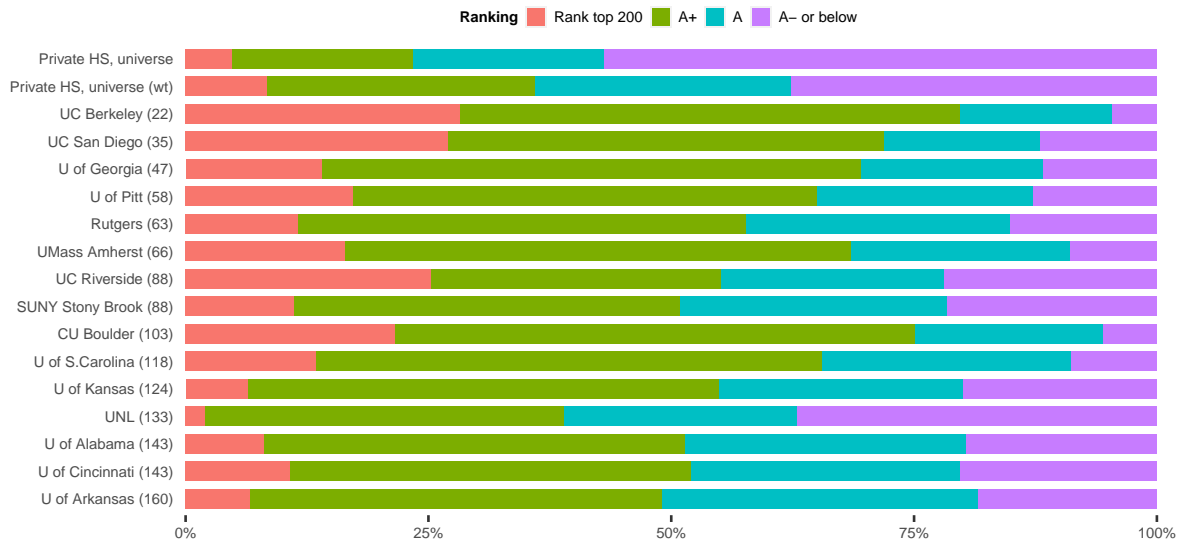


Figure 9: 12th grade enrollment of visited private high schools

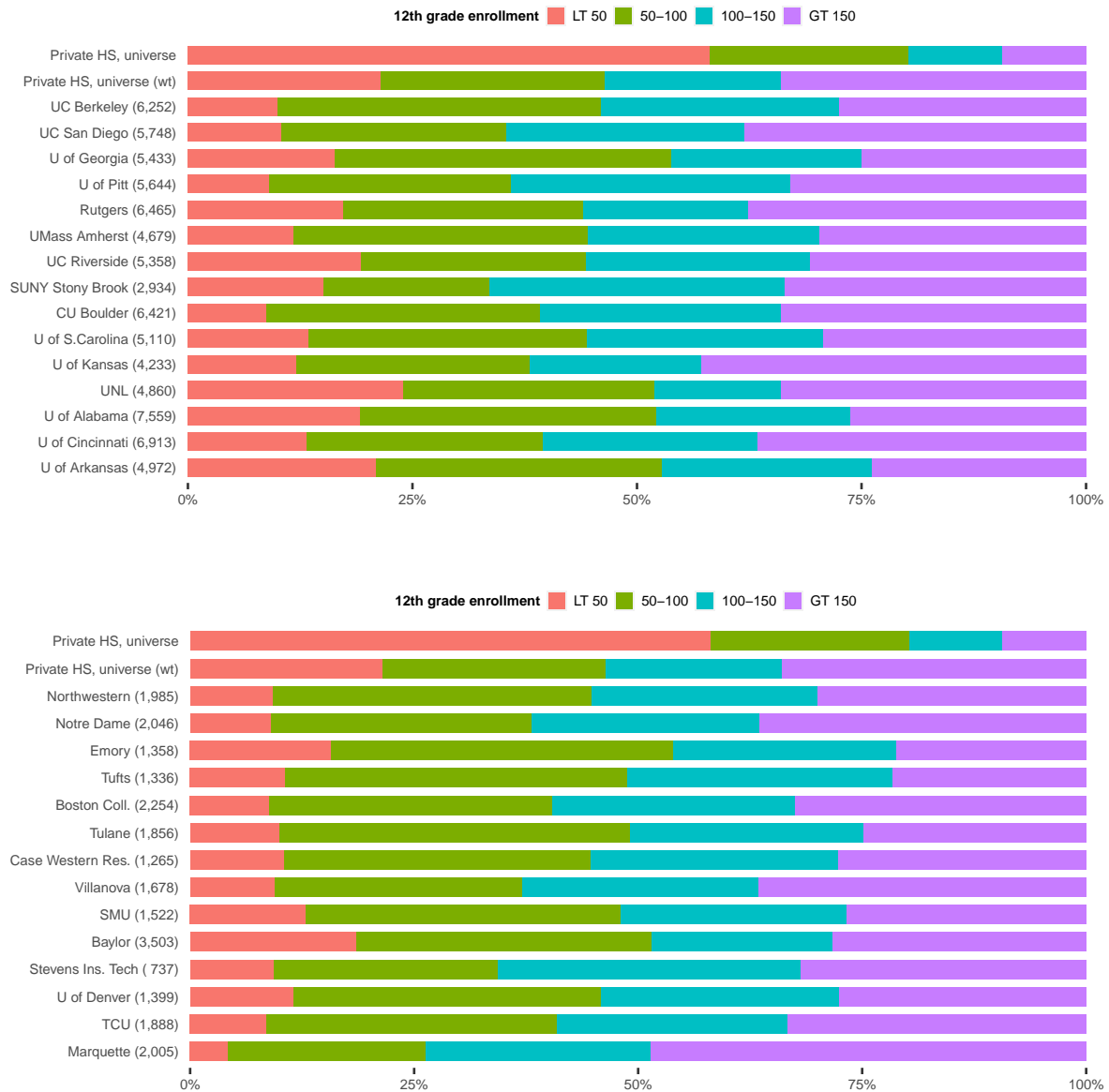


Figure 10: 12th grade enrollment of visited private high schools vs. public high schools, public research universities

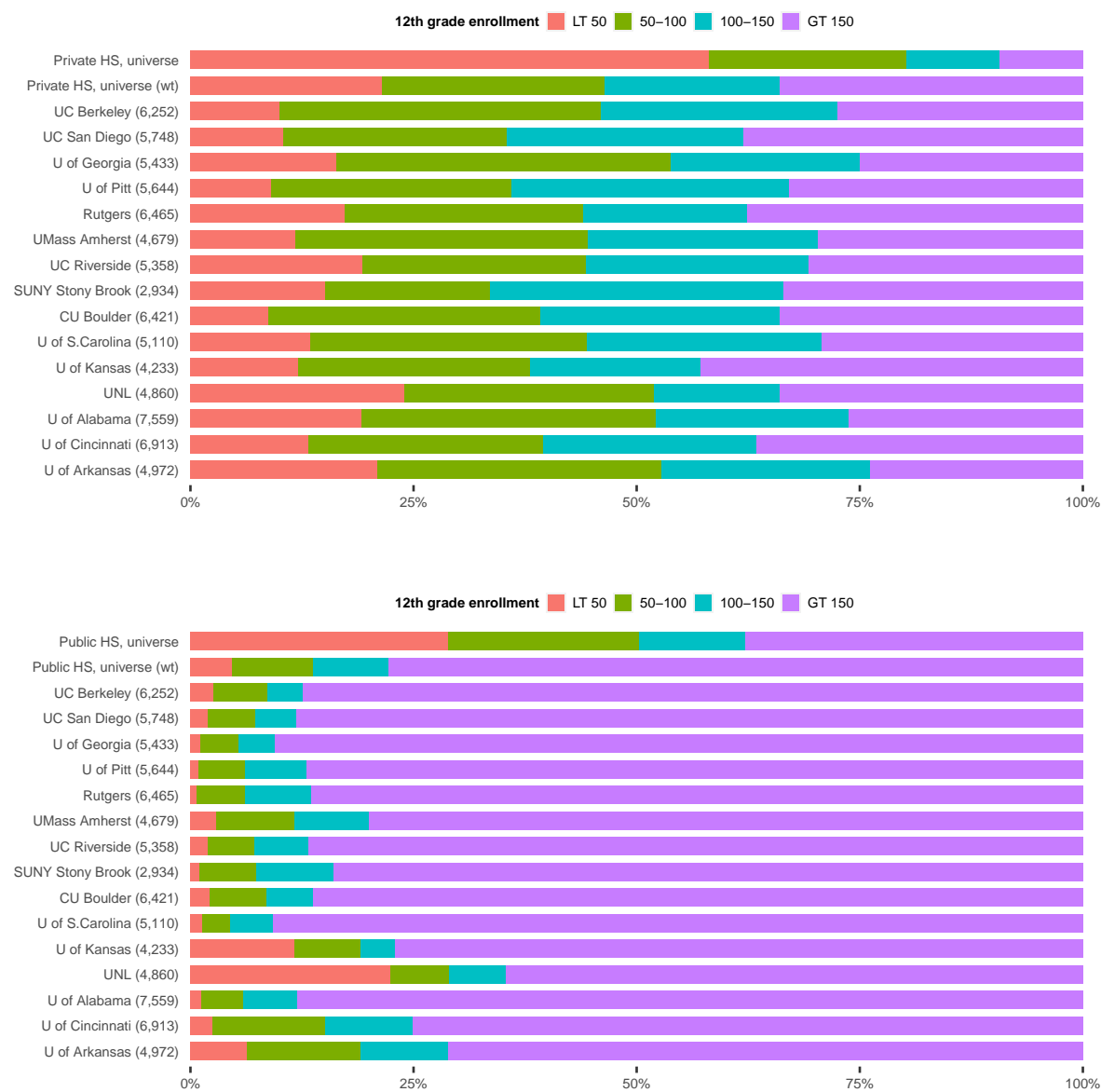




Figure 11: Percentage of students who identify as Black, Latinx, or Native at visited private high schools

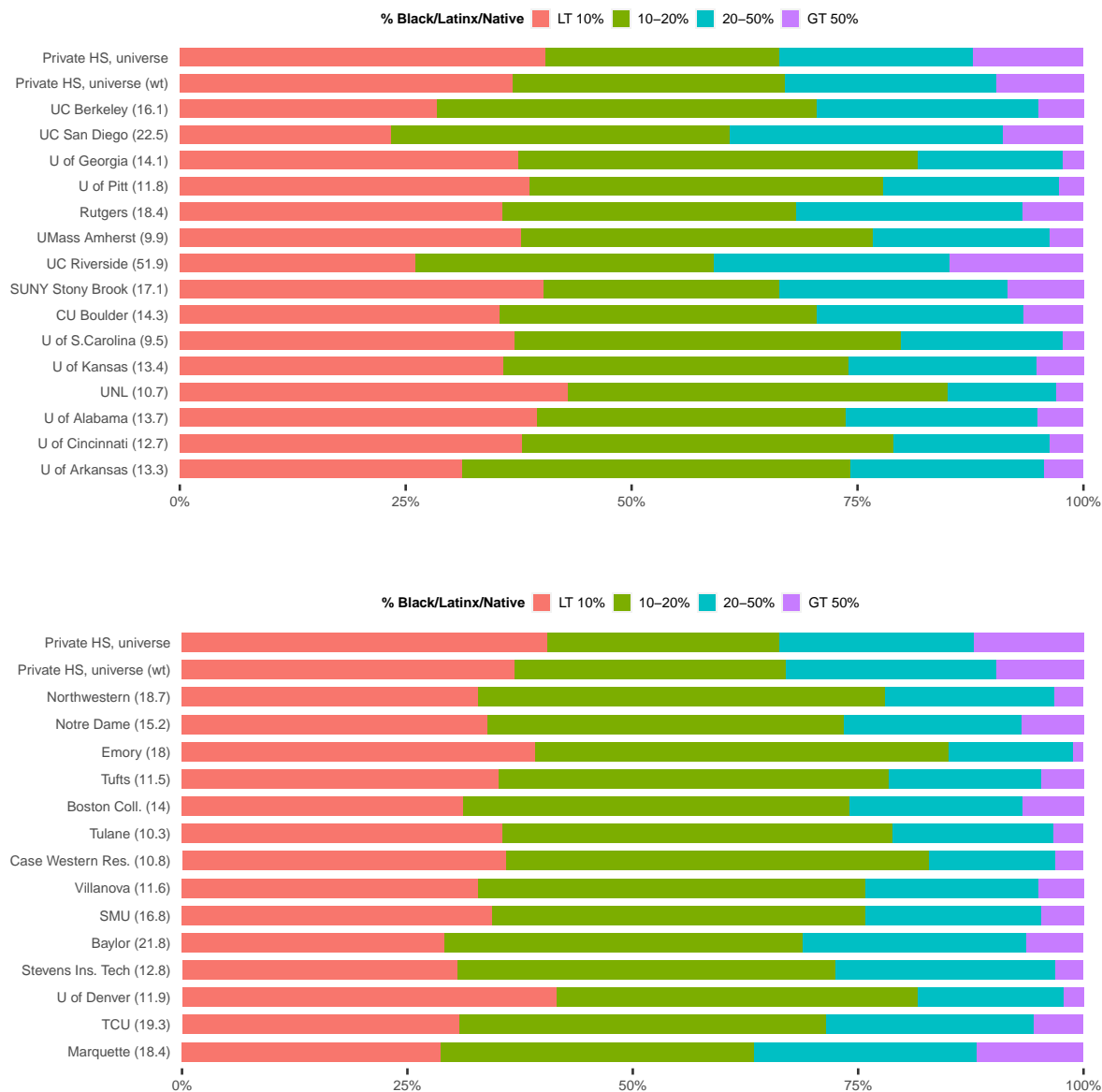


Figure 12: Percentage of students who identify as Black, Latinx, or Native at visited private high schools vs. public high schools, public research universities

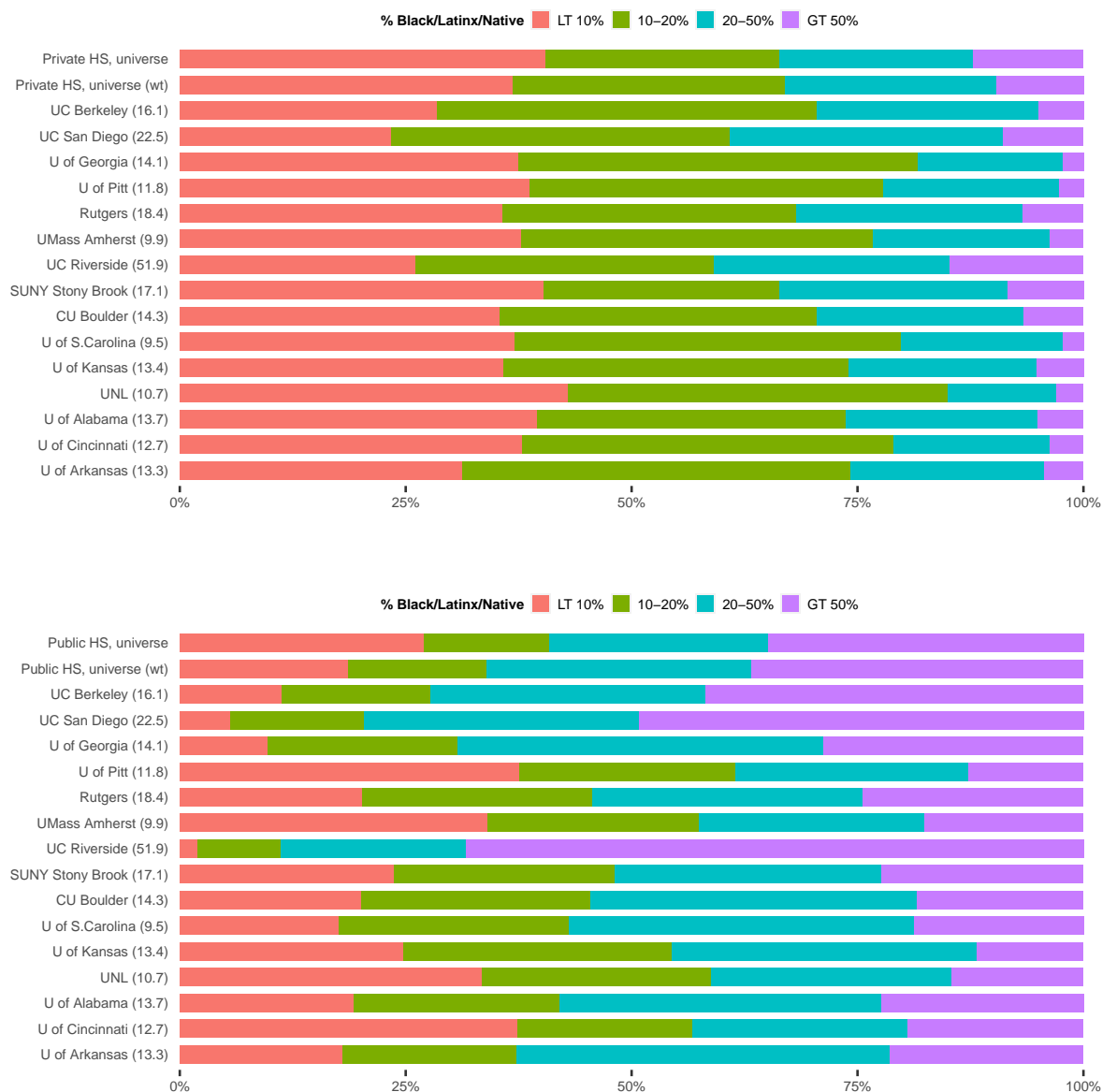


Figure 13: One-mode network for public institutions, colored by cluster

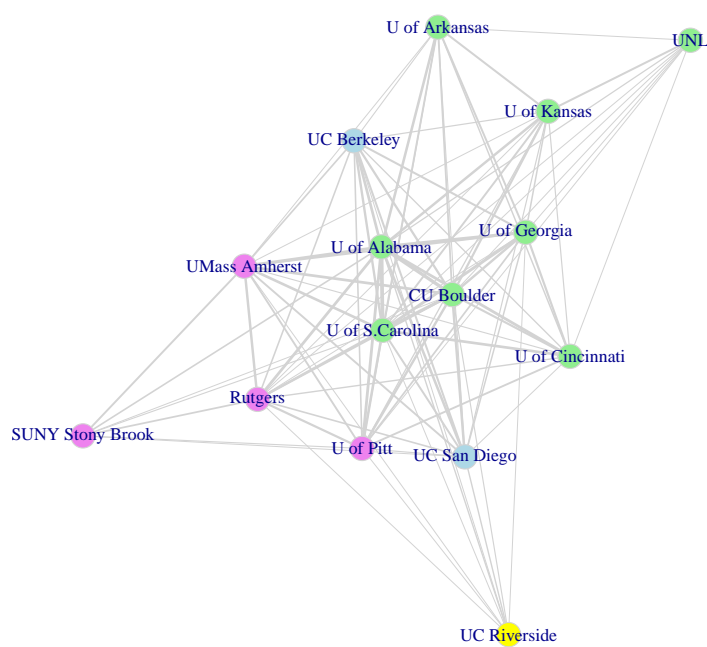


Figure 14: One-mode network for private universities, colored by cluster

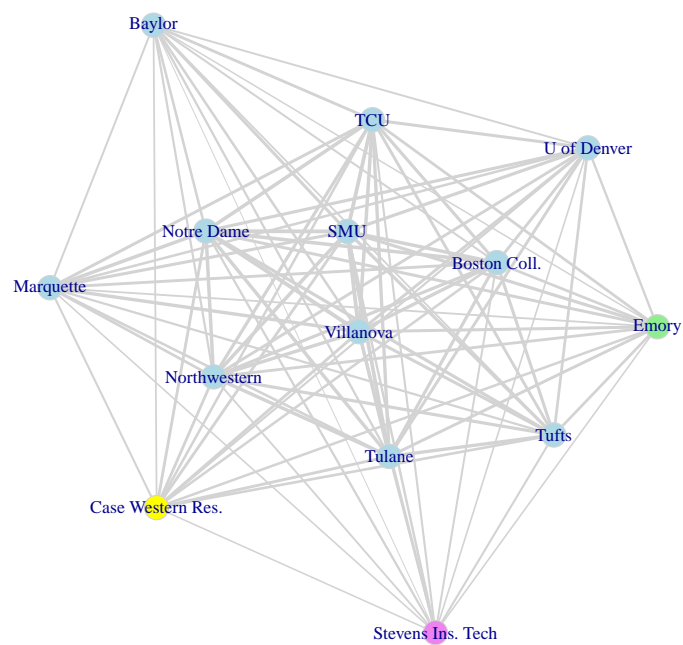


Figure 15: One-mode network for public and private universities, colored by cluster

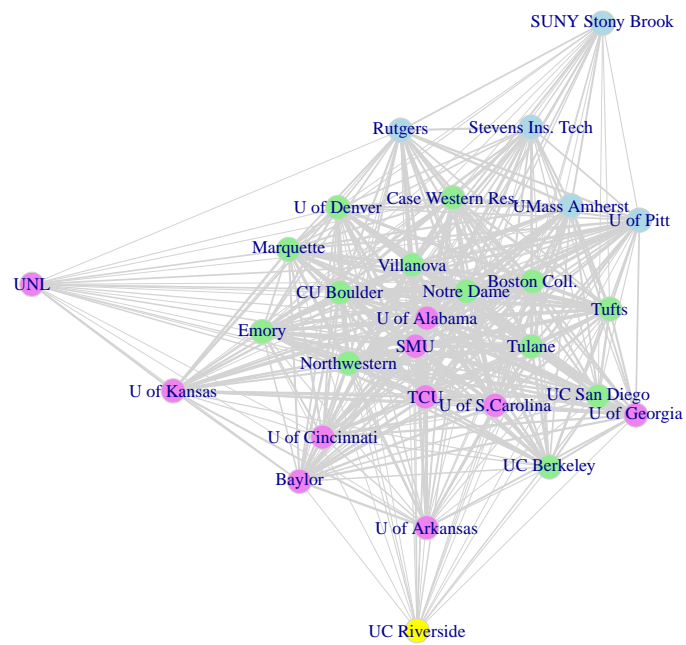


Figure 16: Number of visits by type and in-state vs. out-of-state, public research universities

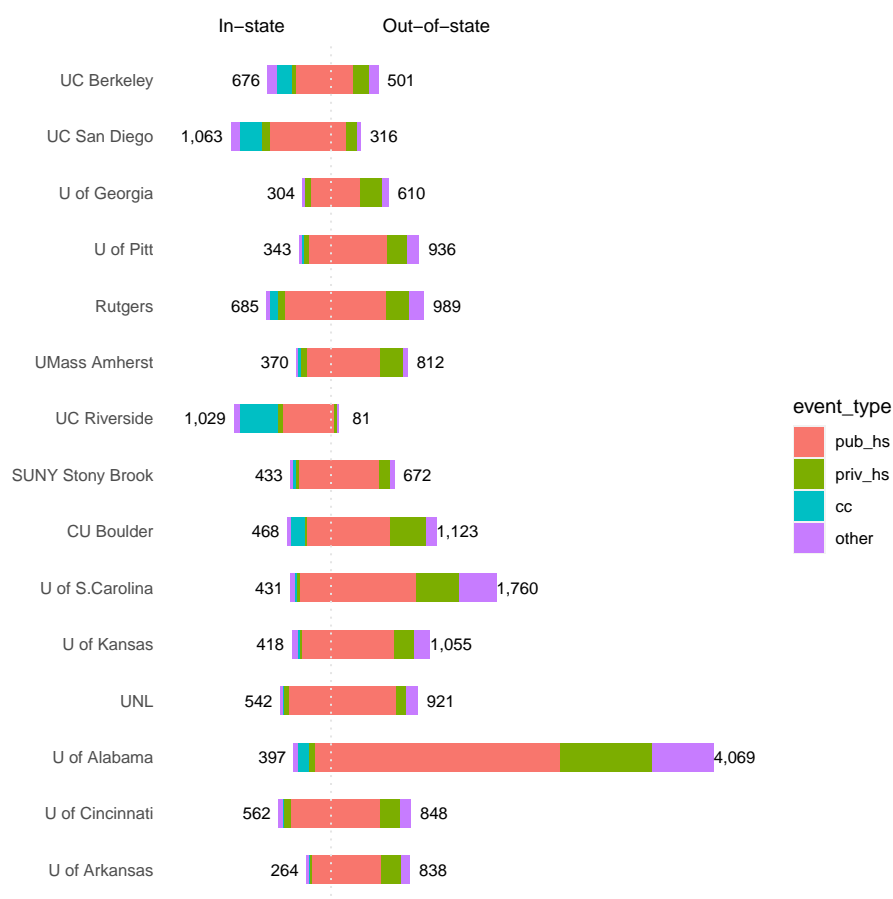


Figure 17: Number of visits by type and in-state vs. out-of-state, selective private universities

