Q's and A's

A Mixed Methods Approach to Evaluating Student Course Selection

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ABSTRACT

Students in higher education face a wide assortment of academic decisions, with semesterly course selection chief among those concerns. While the current literature has identified correlations between student background factors—including race and first-generation status—and educational outcomes, there is a key gap in knowledge on why and how these factors cause these differences. Our group leveraged a mixed-methods study of Harvard undergraduates combining a quantitative survey with semi-structured interviews in order to understand how public school and private school background affect how students make course selection decisions at college. We found that public school students felt overwhelmingly less prepared for college academics, which factored prominently in how they selected coursework. However, the reasons why students chose certain courses and the resources they consulted exhibited less distinction between our two experimental groups, though we were able to conceptualize some broader course-selection strategies. As a whole, our project lays out key observations about student course selection considerations and demonstrates how differential access to educational resources from secondary education propagate in tertiary academic decision-making.

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By signing below, we affirm our awareness of the standards of the Harvard College Honor Code:

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INTRODUCTION

Upon entering the gates of Harvard College, first-year students quickly begin planning their coursework for the upcoming semesters and years ahead. When a student searches the online course catalog, they are met with thousands of available classes to fill their schedule of four or five courses per semester. A general search within the course selection guide for courses offered in the Faculty of Arts and Sciences alone produces a list of more than a thousand options. By the end of their first semester of sophomore year, students also declare an academic concentration from a list of 50 academic concentrations (Harvard College, 2019). With such a large number of options for students to choose from and an even larger number of combinations of those options that represent all the course combinations a student may take within their time at Harvard College, students often feel overwhelmed when constructing the most suitable academic pathway. Amidst the multitude of options available, we asked what factors influence how students decide on what courses to take in a given semester.

To approach this, we first examined previous studies that have identified factors that influence student choices in college selection. Previous studies by Smith et al. (2019) have suggested that student demographics—socioeconomic status, race, and first-generation college goers—influence student decision on the college they enroll in. Since demographic background has been previously shown to impact how students decide on the college they ultimately enroll in, we wanted to explore whether a similar set of factors also dictates how Harvard students make academic decisions, specifically course selection, upon arrival to Harvard. These considerations led our group to develop our research question: **How do students make course selection decisions at Harvard College, and how is this influenced by secondary school background?**

In this paper, we conceptualize academic trajectory as the collection of courses that students select throughout their entire undergraduate education. As such, we will primarily be focusing on the demographic factors that impact student perspectives on how they select courses. We recognize that academic trajectory encompasses more than course selection, as the collection of courses students select can both influence and be influenced by the concentration or career paths they choose to pursue. However, due to the limits of our short time frame, data collection, and target population, we felt that focusing on course selection would be most convenient and fruitful for our research question. The sub-questions we hope to address include: (1) How do students from different backgrounds perceive different courses?; (2) What resources do students use most in

planning their coursework?; (3) Do the responses to these questions differ by secondary school background?

There are many demographic factors—such as those described by Smith et al. (2019) above—which have been explored for college selection, and we were interested in exploring a combination of such factors. We selected secondary school background as the key independent variable because it allows us to explore a comprehensive set of demographic factors in a single, well-defined characteristic. Because secondary school quality varies so greatly across the United States, we thought that a division on the basis of secondary school type was an apropos start in distinguishing between sets of multiple demographic factors. More specifically, secondary school background will be divided into two subcategories: private and public. We define private schools as those operated and supported by private organizations and individuals outside of the government. We define public schools as those supported by public funds and adhere to specific boundaries and school districts. While we recognize that other school types—such as magnet, charter, and specialized schools—exist, our methodology will focus on comparing the two larger categories of private and public because of their differences across a variety of demographic factors such as socioeconomic status, geographic location, and level of preparedness for college that were previously identified to influence course selection. The other school types will be recognized and addressed as subsets of the two larger categories of public and private if relevant.

The goal of this research project is directly relevant to student academic experience both at Harvard and at any similar institution of higher education. An informal brainstorming session with a confidential university administrator indicated that the issue of course selection, specifically as it pertains to inequities in student background, is an actively-discussed question among Harvard faculty committees as they develop new resources and evaluate its efficacy in serving the entire student community.

The major components of this paper are as follows. First, the literature review discusses relevant scholarly works related to student course selection and identifies gaps in knowledge. This identifies and situates our research in relation to past studies. We then discuss the logistics and rationale behind our research methodology. This overview specifies types of data collected, procedures, and conduct. Within the methods review, we recognize both our unique and shared positionality as researchers in order to avoid any bias that may distort our findings. We then discuss findings: first, we provide a set of figures which represent our quantitative data, and next provide

analysis combining the information gleaned from both our survey and interviews. Finally, we provide a conclusion that summarizes our work, offers recommendations, describes limitations, and proposes future directions.

LITERATURE REVIEW

In reviewing literature surrounding our research question, we attempted to analyze college student choice as a whole, acknowledging but not limiting ourselves solely to secondary school variability. To develop a broad understanding of the existing work, we covered related but separate topics spanning preparedness and matching, decision-making theory, effects of background, and resource utilization. Using a narrowing approach in accessing the scholarly works in relation to our own work, we were able to identify the location, extent and range of our research from a broader context to a more refined frame.[2]

As previously mentioned, we began by analyzing the existing literature that identify factors that contribute most to decision-making in college selection. Previous studies have approached the topic of selection by examining "matching", which refers to how appropriately a student's academic ability aligns with a college's academic selectivity. The published literature has identified significant issues with matching between students and institutions of higher education. Research conducted for the College Board by Smith, Pender, and Howell (2013) empirically identifies the issue of academic undermatch, measuring that around 41% of students ultimately matriculate at universities that they are probabilistically over-prepared for (p. 253). These findings are corroborated but further expanded on by Dillon and Smith (2017), who expand the paradigm of matching by describing cases of overmatch (p. 51). While the first study argues that undermatch is correlated to and exacerbated by identity factors including socioeconomic status and familial experience with education which make certain academic environments a better fit for students, the second indicates that the opposite phenomenon can be true as well: students which may be underprepared by their secondary education may overmatch due to constructed conceptions of prestige which play an undue part in decision-making. Reay et al. (2001) takes a step beyond quantifying matching, opting instead to pick out characteristics of Cambridge University flagged

[2]Though modules discussed in class have framed how we think about this project and higher education more broadly, we elected to focus on readings outside of class which were more specifically focused on our topic. Given limited space and a plethora of literature, we used only Academically Adrift from our course readings.

by students of underrepresented groups which helps piece together the factors considered in fit decisions (p. 863). Together, these studies contribute to an understanding of higher education as containing obstacles that keep students from their optimal academic learning environments. Moreover, they identify a gap in understanding the root causes of these distortions, both systematically on the basis of identity and at the level of the individual student, which our team's work seeks to address.

The issues of matching reverberate through the course decisions students ultimately pursue. While broad questions of preparedness and institution choice are important framing tools, researchers interested in student choices need to focus more sharply on decisions. To contextualize these questions, Steptoe-Warren, Howat, and Hume (2011) have provided a theoretical review that describes a psycho-managerial thinking model which combines individual, social, and economic value structures (p. 246). Under this framework, individual decisions cannot be divorced from the milieu of social factors that an actor sits in, and that there is an exchange between these aspects of life. This theory meets praxis in the work of Clara Lewis (2017), who by ethnographic exploration of humanities students sets forth a finding termed "stigma allure" which posits that students can subvert or take advantage of prevailing norms in order to position themselves more favorably when selecting disciplines (p. 378). This is not to say, however, that there is consensus on this complex interdisciplinary approach. Some sociologists claim that academic choices must be grounded in an amalgamation of social and community-based factors. For example, studies of student retention by Demetriou and Schmitz-Sciborski (2011) hinge on Tinto's model of student integration, which posits that social factors of an institution influence a student's decisions both to stay with the institution and pursue its mission (p. 3-5). Others such as Hagedorn et al. (2007) seek to pare away extraneous factors and focus in on the economic view of rational choice theory when modeling student decisions in the process of class selection (p. 467). In aggregate, the theoretical and empirical literature exploring decision-making provides a trove of interesting lenses and ongoing debates for this project. These studies indicate that students are influenced, consciously and subconsciously, by their environments and the costs and benefits of their specific situations. What remains to be discovered, however, is to what degree these various factors play into complex choices, especially when it comes to specific course selection.

To add further complexity—and center this project as immediately relevant to the issues facing modern elite institutions—to student choices, much of the literature suggests a key

correlation between demographic labels and academic decisions. A study by Banai and Perin (2016) of Croatian gymnasium—where curriculum covers a wider set of discipline—-and vocational schools—where curriculum focuses on technical skills for one profession—concluded that a student's secondary school experience is a far more salient indicator of college success than other variables (p. 9). While this finding is echoed in other studies, such as Pinxten et al.'s (2015) work in Belgian major choice, there is disagreement on which exact outcome variables play the largest role, how these variables intersect with one another, and how a researcher can remove confounders endemic to these types of studies (p. 1929). These questions run directly parallel to the distinctions that Arum and Roska (2011) have identified when sampling learning outcomes between students of different racial backgrounds, such as informative comparisons drawn between white and African-American students due to inequities in faculty expectations and institutional quality (p. 137). This work motivates our research design by exposing the gaps in understanding about the contributions and interplay between these disparate factors, highlighting important characteristics particular to our interest such as secondary school type, and offering qualitative and statistical approaches that can work towards disentangling these complex problems.

Underlying these complicated and related questions are the tools and resources with which students interact with courses. Much of the current literature on this topic has focused on remedial classes as a way of preparing under-resourced students in college. Bettinger and Long (2009) found in a study over almost thirty thousand students that remediation programs focused on math and English improved retention and degree completion (p. 737). Similar studies run by Zeidenberg, Jenkins, and Calcagno (2007) show that success courses—which focus on meta-skill development beyond simply information gaps—can help catch underprepared students up to speed and improve educational outcomes (p. 1). Despite these exciting findings, however, these two works emphasize an existing gap in the methodology; while they seem to indicate a correlation between remediation and academic performance, their survey design leaves out important considerations of student perceptions, experiences, and voice. Some studies have sought to address how underprepared students perceive their experiences at elite institutions but have used broader metrics beyond course selection to evaluate such experiences. For example, a study of nine students by Reay et al. (2009) applied Bourdieu's field theory to understand the reasoning behind university matriculation for working-class students at elite universities (p. 1103). Another large-scale quantitative study by Peterson (1993) identified that self-efficacy—a student's perceived self-confidence—was the key

variable in explaining overall academic and social integration for underprepared college students. Peterson also showed that self-efficacy is often influenced by the academic environment of teachers and peers. Nonetheless, there is a clear dearth in describing how students come to take these classes and the factors that keep them engaged and successful. With this landscape in mind, a key aspect of our research design will be to pick apart the specific reasons why students pursue the paths they do through both quantitative and qualitative probing of their decisions.

Though the following paragraph focuses on methods, we discuss it in our literature review to highlight where our work rests, builds upon, and enters into conversation with the research of others. Our team's research methodology arises as a direct response to these past studies by both building off of and addressing the gaps they have not yet covered. Our decision to pursue a mixed methods approach—incorporating both a survey and long-form interviews with individual students—synthesizes various trends that have been discussed previously. As Pinxten et al. (2015) and Dillon and Smith (2017) discussed in the previous paragraphs have demonstrated, larger datasets which collate and quantify the effects of different decision variables will allow us to more effectively tease out specific reasons why students choose specific classes. At the same time, providing the space for students to elaborate and provide contextual information about their experiences with interviews like Lewis (2017) and Reay et al. (2009) conducted will allow us to inductively expand our understanding of the myriad factors that play into this process. Similar mixed-methods have been successful before; for example, Lang's dissertation (2007) on gendered decision-making in the IT field, which provides a useful proof-of-concept template that serves as a scaffold. As we are collecting this data, it will be important to consider the comfort of the interviewee to receive more honest answers: while we will not conduct walking interviews (given our limited time) in the same way that Holton and Riley (2014) have, finding ways to make space for students to immerse themselves and reflect on their position in Harvard could provide useful insights about decisions made on campus. It will be equally important to evaluate the quality of our data and whether it is approaching saturation, which Saunders et al. (2018) indicates can occur at multiple levels, including sampling, analysis, and data collection. Although we are unable to collect our quantitative data at the scale of many previous studies such as Bettinger and Long (2009) or Peterson (1993) have been able to conduct, statistical approaches including correlations and predictive variables of student responses can still be employed within the limits of our dataset. Our methodology seeks to address the twin challenges of statistically disentangling confounding

variables while simultaneously offering space for new lines of exploration, and our data collection process will require metacognition on the salience and potential redundancy of certain data.

With this review in mind, we seek to test the hypothesis that secondary school background influences student decision-making in their academic trajectories. We expect that our findings will run in parallel with previous studies demonstrating that student demographics affect college selection. In particular, in accordance with the contrast between the demographic makeup of students at public schools and elite college institutions, we predict that public school students differentially use resources to inform their decision-making in course selection.

METHODS

To collect data for our research, we utilized a mixed-methods approach combining both quantitative and qualitative analysis that directly followed from analogous past studies identified in our literature review. Our quantitative data was collected from a survey distributed to a sample of Harvard College upperclassmen, while our qualitative data was gathered by a series of semi-structured interviews with students ranging across all class years.

The first arm of our methodology involved a survey, which amassed data about the dependent variable (course decisions) from a large swath of the university and correlate it with our key independent variable (secondary school background). Our sample for the survey consisted of upperclassmen students in Cabot House, one of Harvard's residential houses. In our research, upperclassmen are defined as students who have previously completed at least one year at the college and are members of either the Harvard Class of 2020, 2021, or 2022. During the fall semester of their second year, students at Harvard declare their concentrations and plan for the remainder of their academic experience. Distributing the survey to upperclassmen after the concentration declaration deadline is pertinent to addressing our research questions because these students have established a more concrete academic path. The rationale for this sample was that all upperclassmen students are randomly sorted into one of twelve undergraduate houses, and, due to the randomized nature of the housing system, the individual houses are thought to serve as a microcosm of the college as a whole. Houses represent a diverse array of concentrations, hometowns, ethnicities, interests, and backgrounds. By choosing a randomized sample population, we avoid selection bias within our research and are able to affirm key identity assumptions of the sample that allow us to most accurately generalize our results to the larger population in question.

Thus, upperclassmen in Cabot House served as our representative sample of the Harvard upperclassmen population.

To recruit respondents, we avoided list-servs and relied on individual email recruitment. The rationale was that some students unsubscribe from open lists but do not block individual accounts, so we reached a larger swath of the House population. The Harvard College Student Directory shows only 331 of 367 students in Cabot House had their email addresses publicly available for other students to access. We recruited the respondents directly via email on a Google account created solely for this research, starting with an initial recruitment email, and then following up weekly over a three-week period. This method sought to minimize bias—since we reached out to everyone we had access to—while improving turnout over a link drop over a list-server. During our attempts at follow up, some of the emails were blocked by intended recipients' spam filters. Moreover, some recipient responses were incomplete, so we elected to remove those uploads. While we originally gathered more than 70 responses, we pulled our final results from 48 complete responses; by estimating that some students are abroad or taking a leave of absence (thereby forgoing course selection), or by definition anonymous by removing contact information from the College, this collection of 48 responses hits a 15% threshold if we consider our sample to be 320 Cabot residents that we could reasonable reach out to.

With our survey data, we operationalized and correlated the relevant variables by measuring demographic profiles of our surveyed students (student attitudes regarding course selection, our observed respondent variable, with respect to the observed demographics will be more thoroughly gauged through interviews). Our survey measured two types of demographic indicators. The first encompassed factors describing student profiles prior to enrolling such as type of high school attended, financial aid status, and geographic location. By operationalizing such variables, we explored whether or not students from public high schools have different course selection strategies than those who attend private schools. The second encompassed factors describing student profiles at the current stage of enrollment, such as current courses, class year, and concentration. These indicators allowed us to explore our research question from a variety of angles. We also surveyed what resources and considerations that students have and utilize when making these decisions. In the same way that multiple studies in our literature ran large surveys, we analyzed our data by quantifying how many students use certain resources, whether these trends

change based on background, and whether these discrepancies (if they exist) hold statistical significance.

To complement this quantitative data, we noticed that many of the current gaps in literature involved student explanations of their course selection experiences. For this reason, we decided to include in our research design a qualitative, semi-structured interview component, which implemented a convenience sampling method to increase interview response rate. We identified initial students from our polls and recruited other interested respondents through communication networks accessible by our peers in the course. Ultimately, our interviews investigated two distinct groups classified by the type of secondary school the individual attended, our key variable. The first group is those who attended private schools, whereas the second group is those who attend public high schools. We initially sought a sample of eight in each group for a total of sixteen individuals for semi-structured interviews. However, we managed to interview nine students who attended public schools, and seven who attended private schools (crossing the saturation threshold of six in each group and reaching the course guideline of sixteen total). We interviewed fourteen American students and two international students from the British schooling system (one was a public school student, one was a private school student). Furthermore, our interviews consisted of seven seniors, three juniors, four sophomores, and two first-years. Overall, our sample had all class years and multiple school types represented.

Our interviews inductively explored how students view their backgrounds and course selection, and the responses were coded to uncover themes relating to topics like resources utilized while at Harvard and experiences selecting courses and concentrations. Particular emphasis was placed on overall feelings of preparedness for courses while looking specifically at variations among type of high school attended and how secondary school background influences student behaviors and decisions throughout their academic experience at Harvard. This analysis allowed us to identify broad commonalities in experience by students of different backgrounds, which we cross-checked against the findings from our surveys.

As mentioned previously, we believe that a mixed-methods approach is the most effective way to answer this question. We see from our literature that surveys such as those conducted in Hagedorn et al. (2007) provide us the ability to draw out statistical correlations and link our independent and dependent variables over a large sample representative of the student body. At the same time, interview-based approaches such as those in Lewis (2017) offer us an opportunity

to inductively discover broader trends while offering students space to voice and describe their individual situations beyond a preset collection of responses. By combining these two strategies, we have methodologically triangulated a path towards answering this difficult question while offering us opportunities to verify our conclusions along different lines of inquiry.

ETHICAL CONDUCT AND POSITIONALITY

As a group deeply invested in addressing inequities in education, we crafted this research design with the core principles of ethical conduct as set forth by the Belmont Report, ensuing literature, and the guidelines provided by CUHS. We respected autonomy by providing students with informed consent, descriptions of our project, and the opportunity to opt-out or remain anonymous. We respected justice by considering inherent power dynamics as discussed in our positionality section and understanding that students sharing personal, identifying information can be marginalizing. We recognize that any such study with private information has the potential to cause maleficence if mishandled, but we minimized this by being especially careful with our communications and final report. Moreover, we hope that the beneficence of our final findings are able to counteract these risks and tangibly improve student life.

It is important to critically examine our positionality in the context of our research project and acknowledge how our identities and situation within our research project complicates our design. We are a group of students interested in exploring the inequalities in education based on secondary education, but all of us were public school students which may bias our work based on lived experience. Ian and Rick are both House Committee chairs—Ian is the head of Cabot House, our sample group—and need to be careful about avoiding a coercive dynamic in response and outreach. We also bring a set of academic enmeshments to our work. Rick is on the Committee on Student Life and works with faculty to make university policy, and Yi is a member of the course staff of LS50 and addresses student recruitment for the course. Although we bring a unique set of perspectives, it is vital to note that no four individuals can be a complete, intersectional representation of the entire student body, and the absence of certain identities may directly challenge and limit respondent comfort during research collection such as interviews.

At the same time, a comprehensive discussion of our positionality can open doors to exciting opportunities as we move forward in our project. Three of the students on our team are from the Midwest, a traditionally (and currently) underrepresented region in the United States at

Harvard, and our experiences have informed our interest in closing analogous gaps at our university. We span a variety of academic concentrations, extracurricular experiences, and career aspirations, which gives us a fairly cross-sectional view of our topic and academics at large at Harvard. Far from limiting the efficacy of our work, considering our points of view, goals, and backgrounds enriches our work and allows us to proceed with both vigor and care.

RESULTS AND FINDINGS (FIGURES)

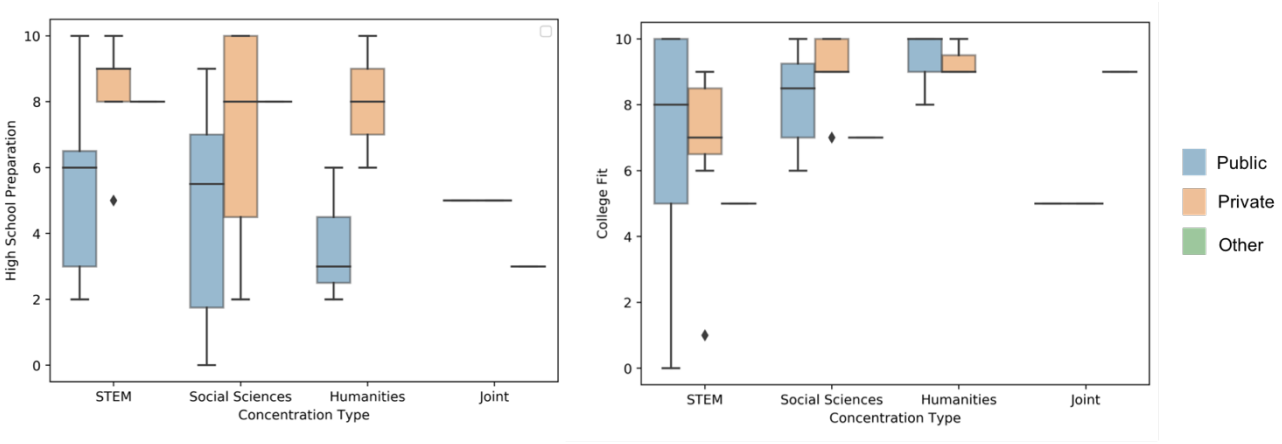

Figure 1. Self-reported High School Preparation and College Fit. The box plots above display perceived high school preparation and college fit categorized by concentration type and secondary school type**.** The middle line represents the median (50th percentile) of responses. The lower and upper bounds of the colored box capture the 10th and 90th percentiles of the data. The extending line beyond the colored box captures the range of responses from the 2nd to the 98th percentile. Outliers within the data are represented by a diamond. Public school students, shown by the blue bars, reported lower perceived preparation within all concentration categories with statistically significant sample sizes. Among all surveyed students, public school students reported at a score of 4.9 out of 10, compared to 7.6 for their private school counterparts.

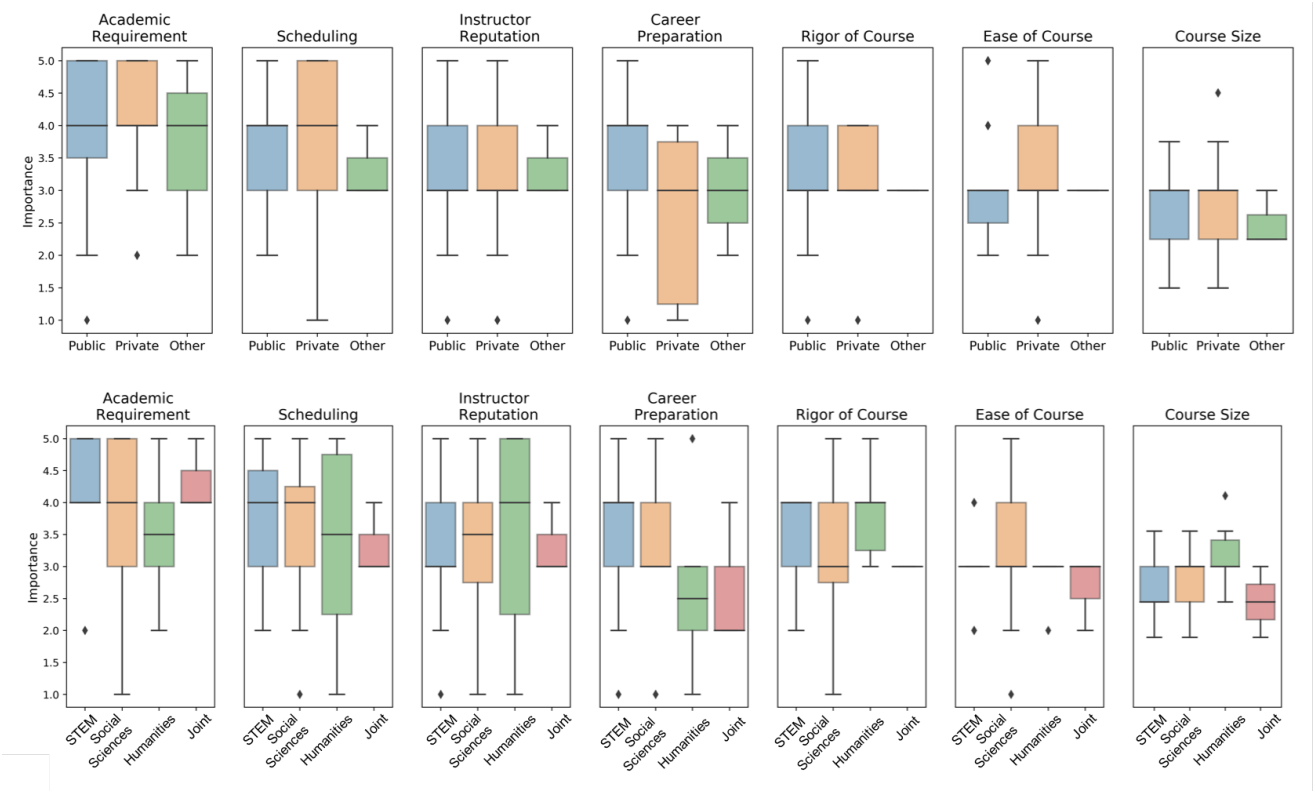

Figure 2. Reported importance of course characteristics in course selection. The boxplots above display the importance, scored on a scale of 1 to 5, of class characteristics categorized by secondary school type and concentration. Academic requirements and scheduling concerns scored highest in importance, while course size scored lowest among all categories. Trends above were similar when students were divided by concentration type, however, STEM and Social Science concentrators assigned career preparation as more important than rankings made by Humanities or Joint concentrators.

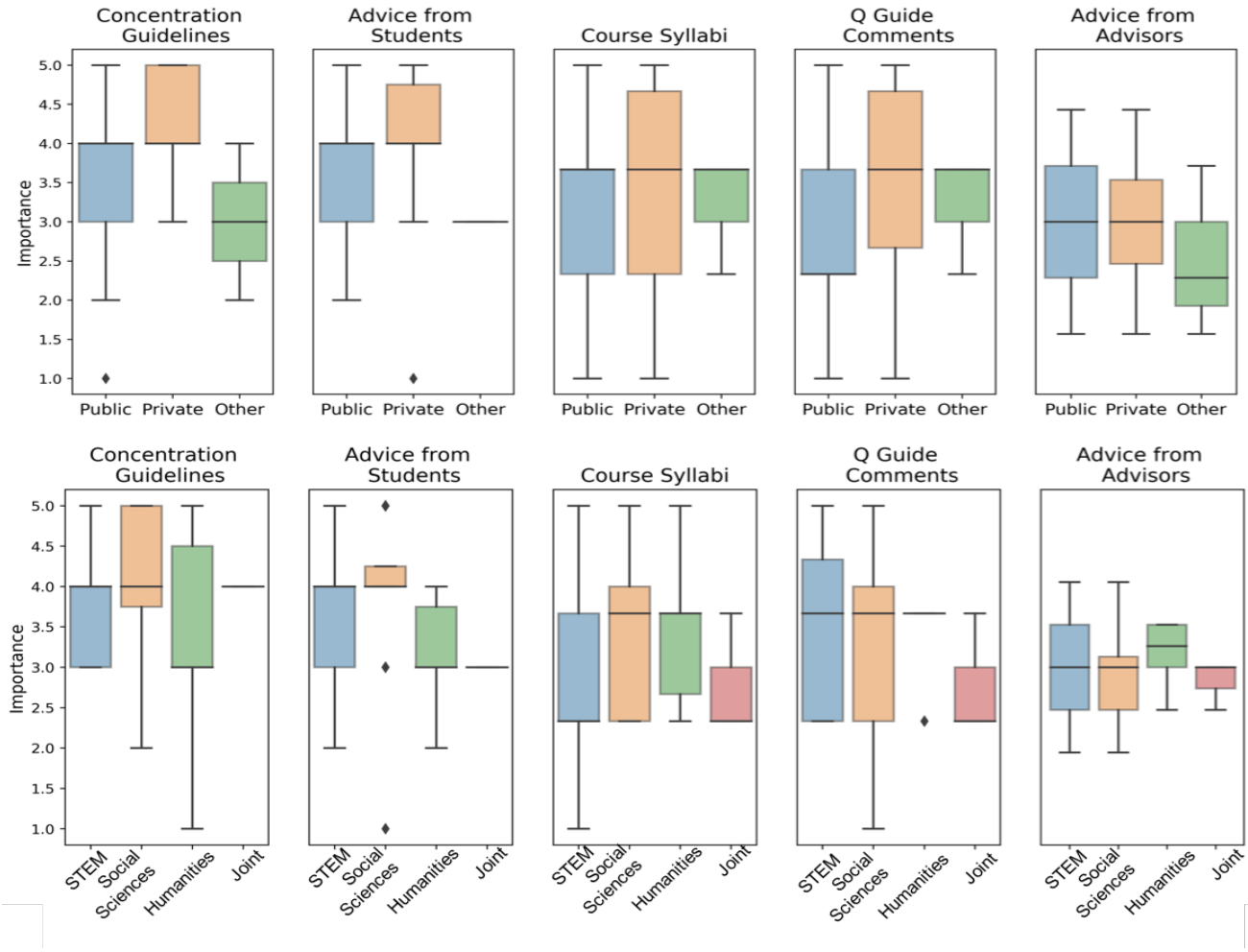

Figure 3. Reported importance of resources for course selection. The boxplots above display the importance, scored on a scale of 1 to 5, of class characteristics categorized by secondary school type and concentration. In all cases, concentration guidelines scored highest in importance at 3.8, followed by course syllabi at 3.7. Q guide comments and advice from fellow classmates scored 3.6. Advice from formal academic advisors ranked lowest overall at 2.9.

RESULTS AND FINDINGS (ANALYSIS)

Differential preparation based on high school background

As we expect from the literature, and as we see reflected in the quantitative data, self-measured preparedness correlates with student high school background (Fig. 1). Indeed, testimonials provided during interviews show a stark difference in described experience between students who attended private schools and public schools.

Private school students almost uniformly received resources priming them for Harvard's academic environment. Students reported that their typical high school classes had high faculty to student ratios; most respondents reported small class sizes of around fifteen people or less. Moreover, learning opportunities were not constrained to just the classroom setting. Students who attended private schools noted that they were able to take advantage of institutional cultures of continued support. Multiple mentioned that their teachers offered some analog to college office hours; they either checked in with students after class time or carved out additional time in their schedules to do so. Some private schools even offered specific periods a few times a week where students could visit their teachers or others who were familiar with subjects to provide extra feedback. These less-structured support resources are noticeably similar to Harvard's model of classroom support, and it was clear from the interviews that familiarity was an important tool to accessing the myriad resources that the university provides.

Conversations with public school students revealed significant academic barriers compared to counterparts. Student responses were often negative with regards to preparation, and many noted a world of difference between their secondary and tertiary schools. Some public school students even went as far to describe their high school as "objectively the worst" or "a total cesspool." These differences extend much further than the resources mentioned in the previous paragraph. For many public school students, the issues spanned issues as fundamental as course offerings and curriculum. Whereas the vast majority of private school students mentioned having some sort of AP, International Baccalaureate (IB), or accelerated coursework available to them—some of the students were selected for academic tracking as early as elementary and middle school—a fair number of their public school peers did not have similar distinct tracks based on their knowledge or ability level. For these students, the central issue was not simply that they could not best utilize resources or courses available to them: for many, they were not an option to begin with. Jen[3], a

[3] Pseudonyms provided for anonymity.

public school student from North Dakota, explained that "my school didn't have Calculus because my math teacher was just our football coach." As a pre-medical student, not having access to high level STEM course provided significant barriers to various concentrations for Jen, a situation which holds for many in her shoes.

Preparedness at the forefront of course selection

The question of preparedness shown in both our quantitative and qualitative data directly feeds into differential experiences with course selection. One particularly illustrative example is writing classes, particularly the Expos series. Harvard requires all undergraduates to take at least one semester of expository writing. As an introductory course mandated before students have taken multiple semesters of additional coursework (and therefore fairly standard across the entire undergraduate population), Expos provides a useful lens through which to evaluate the differences between students. Moreover, Expos shapes how many first-years think about writing-intensive and seminar courses in later semesters. When it came to this writing class, private school students felt overwhelmingly prepared: they had either been assigned Expos-style writing in the past or had completed similar research and argument essays. The same was not the case for their public school counterparts. Says Beth, a sophomore from a public school in Montana, "I didn't ever write a paper longer than eight sentences until junior year, because we were told that you could write every paper you need to do in an eight-sentence paragraph." Experiences with Expos would prove to be real impediments to self-esteem when making future decisions regarding writing. Further, students who were required to take Expos 10, the introductory pre-requisite for the required Expos 20, found significant stigmas against the course. While most students would converse about their assigned topic for Expos 20, those in Exp 10 recounted feeling isolated from their peers largely because of their background.

The prerequisite system at Harvard additionally privileges students who have strong foundations of knowledge in certain fields, knowledge which depends largely on the quality of their high school education rather than personal ability. For many, it starts as early as the placement exams which occur before the first Harvard year begins. Private school students often mentioned that the material they saw on these critical but short first windows into Harvard academic life well-aligned with AP or IB curriculum that they had worked through previously. The public school students we interviewed, on the other hand, more often found themselves funneled into beginner-

level courses. And while introductory courses are designed to provide extended support and even the playing field, barriers persisted beyond the first year. Jen, who is currently enrolled in MCB 60, an intermediate biology course, states, “They assume that there are no students that took LPSA because it’s a jump to make.” For many students, strict prerequisites delay the option to select advanced classes, which often boast smaller class sizes and closer interaction with faculty members, up to a full school year. But even courses without firm prerequisites still provide hurdles for students that have finished different introductory courses and should be prepared to take them. Says Jen, “That type of assumed knowledge makes it really challenging to play catch up, and not realizing that you have to play catch up, or what to play catch up on things like that, are challenging.”

Students, however, are not without agency: some push back against the restrictions in place. Sarah, a first-year enrolled in Math 1B, enrolled in a higher level math class than her placement. Having taken Calculus at their public high school, Sarah felt it would be a waste of her time to relearn all of that material again. Sarah said, “I went to math advising and told them I was going to do 1b. I told them I'm just not gonna [redacted] do it because I'm not restarting, you’re out of your [redacted] mind. He greenlit it.” Initially leaning towards concentrating in Astrophysics, Sarah felt that, “If I would have started with Math MA, it would have been really hard for me to major in. I mean, you could do whatever it has you start with, but it's just that much harder. It's almost not worth it.” Sarah’s educational background placed her in a situation that she felt was not giving her a chance to meet her potential, so she had to advocate for herself to give herself a chance to study her interests. Though these students navigate and overcome structural barriers to their academic success, the fact remains that there is vast room for Harvard to improve.

The main result from these findings is that there exist what one student termed a “hidden curriculum” looming over Harvard course selection. The term, of course, is expansive and covers a variety of experiences. For many of the public students spoken to, this curriculum refers to a loose network of assumed background knowledge—from historical facts, to discipline-specific writing structures, to mathematical formulas—which depend highly on whether their secondary schools provided a strong basis in what many Harvard instructors and students perhaps unfairly as “core” subjects. This is exacerbated by the experience students who are originally placed into the more accessible of two introductory courses (with good intentions) before being funneled into the same intermediate or advanced course and being seen as unprepared for their selection of

introductory course. Moreover, there is an entire meta-understanding of how to navigate courses—how to lottery classes, how to interact in smaller seminars, how to take advantage of office hours, to name a few—which sits in this "hidden curriculum" and filters the decisions students make about which courses to take. Says Beth from above, "Harvard's amazing when it comes to helping you succeed in classes here. But they aren't good at helping you learn things that you should, like that there are gaps in my knowledge."

While the hidden curriculum proved to be a significant challenge for students from public schools in the United States, the same did not necessarily hold for international students. We interviewed two students from British schools who felt their educational background left them well prepared for the academic rigor at Harvard. William, a biology concentrator who attended a publicly-funded rural school with IB curriculum, felt especially prepared in STEM classes, even saying "up until halfway through sophomore, that was probably the end of the time in which we were still recapping things that I learned before." Katherine, who attended an all-girls private school with an IB program, felt that her "high school is way more intense (than Harvard)." Specifically, Katherine cited her junior paper, an intensive research paper written in high school marked by an external review board. Overall, the international students felt that the intensity and rigor of the British school system left them prepared to navigate academics at Harvard. Though we cannot draw universal conclusions from this small sample, it would be fascinating to think about how other educational systems affect course selection.

A hierarchy of needs governs course selection regardless of background

The next aim was to better understand whether or not high school background differentially impacts how students prioritize factors and resources. In general, we found students from both public school and private school backgrounds rank the importance of various factors at similar levels, with a high amount of heterogeneity within the two experimental groups (Fig. 2). Although it is difficult to tease out broad generalizations from these accounts, the responses still give an interesting picture of how students come to course selection decisions.

Though choosing courses is complicated, personal, and the result of many factors, asking students to walk through the decision process revealed that there is a clear hierarchy of needs when it comes to class selection. As reflected in the survey results, students were first and foremost constrained by practical needs (Fig. 2). Most students across both groups cited course requirements

as the first line of consideration. These guidelines are, after all, firm criteria needed for students to graduate, and academic advisors generally do not lift holds on student enrollment until they deem the choices manageable and in-line with a degree. Interestingly, the selection of courses based on content was based only on a motivation to graduate. Very few students cited academic preparation for future career paths as a strong driver of their class selection (the main caveat here being the existence of medical, legal, and related pre-professional tracks which generally prescribe a set of guidelines as well).

Moreover, students reported a recent trend of scheduling issues with courses. Harvard's introduction of the Allston campus brought a new 75-minute schedule, which has shifted how many academic blocks and by extension, how many class options, students have available to them. Jordan, a senior varsity athlete who has been on the team since her first year, astutely notes, "If I can't physically be there, I can't sign up for the classes." This view was corroborated by other students who had experienced multiple semesters of course selection before the approval of the altered schedule. The changes are particularly troublesome for athletes such as Jordan who have demanding, set practice schedules; they are essentially locked out of swaths of time in their schedules. Even non-athletes have mentioned significant difficulties with the timing switches. One student, Karina, was candid about the effect that course scheduling has had on her physical health. Under the current system, many crucial courses run through lunch, and taking two consecutive classes spans the entire length of the dining hall schedule. Though Harvard's dining services have attempted to extend some of the dining hours to mitigate this issue, food is not always ready in time or close enough for students to make the trip. Students have noted making trade-offs between whether they want to eat on certain days or taking classes. In general, logistical obstacles such as scheduling were the most frustrating and contentious points of discussion with interviewees. Rather than settling on classes because they enjoyed the content or were interested in the professors, students have resorted to picking from a much smaller pool of classes that fit into their schedules and work around meals.

The remaining factors that students flagged as salient were a mixed bag and highly student-dependent. A number brought up interest in course material as a factor they weighed, though these interests were variable and difficult to predict. Even the most interesting classes, however, were only on the table after the earlier two hurdles had been cleared. Students were also split on the importance of course instructor in deciding on whether or not to take the class. Most were

indifferent to the vast majority of professors, and only took it into consideration when the professor was one they either had a pre-existing relationship with or were determined to avoid. Given the fact that most course slots are either taken up by locked-in requirements, these additional concerns were often an afterthought and only affected one or two courses a semester.

Resources are utilized in non-generalizable ways

In order to make these final decisions, students use a combination of different resources. Each individual student clearly had their own preferences about what information was most useful to them, and these distinctions did not fit neatly into the two high school backgrounds we spoke to, though private school students utilize resources marginally more (Fig. 3). However, the conversations were able to reveal interesting findings about how students approach each kind of academic resource, especially between formal and informal resources.

Students tended to have the strongest thoughts about formal resources—staff members or tools built by the university—to help make selection decisions. Of these tools, advising was among the most often-discussed topics. Interestingly, students spoke far more to their experiences with officials from the university (first-year proctors, sophomore advisors in Houses, and concentration advisors) than students serving as peer advising fellows. This may reflect recent changes in the peer advising program which requests students not provide directive academic advice. More often than not, students described disappointment with the formal advising network offered to them: in general, these resources were more useful for double-checking schedules once they had mostly been figured out previously than they were at providing meaningful additional information. Advising was characterized as hit-or-miss: students either had really positive relationships with their advisors or had mostly negative experiences with them. Among the negative experiences were students who either had advisors who were not familiar at all with their course of study, advisors who also served as proctors which cultivated a disciplinary power dynamic outside of their academic meetings, and advisors who were insistent on shaping their academic careers rather than serving as consultants. One sophomore, reflecting on the guidance they received last year, noted that, “I felt as a first year, I was very impressionable. And if an advisor told me something when I was this vulnerable, I would have just gone with it.” Moreover, a common sentiment was that advising was worse at the start of a student’s academic career than it was later on. Students were in agreement that most concentration-specific advisors, which are introduced in sophomore

spring, were in the know and offered far better advice than any of the previous advisors they had worked with.

To complement advisors provided by the university, students discussed a set of informal networks that they developed to help select courses. This agrees with our survey data, which shows formal advisors ranking lowest in importance, with friends ranking towards the top (Fig. 3). These networks mesh well with the relational theories of student life noted in the literature: among the most-frequently cited sources were friends, especially older students who had taken those courses before. These relationships had significant bearing not just on which classes students would take, but also in how they thought about planning out their four years. In some cases, the presence of a friend in a class convinced students to enroll despite originally being on the fence. Reflecting on her choice to take a computer science class earlier, sophomore Avery said, "I might as well do it now with them, when I have other people that I can take the class with." While most students have peers who they can turn to for support, it is particularly fascinating to consider how differential access to Harvard social life can inscribe itself on student academics. One interviewee, who independently brought up that she was in a social organization, discussed additional informal resources that the organization provided for members. Karina confesses, "I'm now in a couple of different organizations that Excel spreadsheets of courses that are easy [...] I more and more have been relying on other people." Students have shown that they learn from those they are in the closest contact with, and in this way, we may fold ties to academic life into larger questions of inclusivity and access in the broader Harvard social scene.

Though the resources above received mixed reviews from students, there are others which are universally leveraged by students of all backgrounds. There was a general consensus among interviewees that the Q-Guide was a useful way to compare classes: though actual workload and efficiency vary between students, using relative workload hours between two courses generally holds true. Q-Guide numerical ratings also vary widely, especially for large concentration requirement classes, though classes with extremely low scores are often screened out by students. Students who typically plan in-depth use additional tools such as department websites, the Syllabus Explorer, and Curricle, though these were far less common than the Q-Guide and were used in addition to rather than instead of the Q. Students who took advantage of multiple tools mentioned that it would be helpful to have a consolidated platform. Junior Taryn notes, "The Q looks like it's from 2006 and they haven't changed its design since" and would prefer a "nicer, smoother way to

look for classes which feels modern." Improving these tools would likely have a sweeping impact on students of all different high school backgrounds.

A broad view of course selection strategies

Synthesizing all of the above information, our group has pulled together three main course selection "archetypes" that students fall into when they are choosing classes for the semester. Note that these strategies are usually adopted by semester, and that students fluidly move between them. Of course, it is important to note here that there is a vast diversity of student experience, and that specific decisions students make are highly context-dependent and semester-specific. That said, taking a macro-view of our interviews pulls out some large buckets which can be useful.

The first role that we describe is the "Cartographer." These students generally have targeted, sometimes niche goals for their academic programs, and they invest significant time researching courses that they plan to take. Says one such student, "I will make a massive Excel spreadsheet with all the times and professors of the class. The Q ratings for the number of hours a week. [...] I've been known to show up to thirty classes in the shopping period." These students develop written (though usually flexible) four-year plans and set specific goals for what they want out of a semester—certain professors, breadth of coursework, and small class sizes, to name a few. As a self-directed group, these students solicit information from a variety of sources but do not lean heavily on others' judgment. Noting his very particular tastes, one Cartographer confesses, "I also don't consult my peers very much."

The second role that we describe is the "Explorer." These students enter the start of their semesters with ideas of what they want to accomplish, though they specifically build fluidity into their studies and leave themselves open for change. These students often cite the importance of shopping week in crystallizing their course decisions. They rely heavily on informal support networks, even taking into account decisions currently made by their peers. We tended to see students move more into this group as they progressed along the course of their academic career and were mostly finished with academic requirements.

The third role that we describe is the "Graduate." Though all students keep concentration and graduation requirements in mind, these students mostly schedule their work around completing coursework expected of them. These students often have classes they know they will have to take in a given semester and plan the rest of their semesters to balance around those requirements. One

Graduate explains, “I’ve got one concentration requirement, one Gen Ed, one Swedish thing, and then one gem. That is my schedule every semester.” Many of these students have extensive extracurricular or athletic commitments which require significant time outside of the classroom and are particularly affected by scheduling concerns, since they will not often sacrifice those commitments to take classes.

Clearly, these strategies do not encompass all of the vast heterogeneity in the student body and its course selections. However, this sort of bucketing helps identify large themes and identify correlations between strategies and resources. Cartographers, for example, disproportionately self-reported highly competitive high school backgrounds which necessitated long-term planning; since they routinely de-emphasize the value of guidance through formal advisors, they likely are not a prime target for administrative interventions hoping to improve academic support. Similarly, Graduates are particularly inconvenienced when scheduling becomes inconvenient. Student decision-making, as we see from the literature, is incredibly complex. Being able to disentangle and conceptualize how students broadly choose is vital to developing future university policy.

CONCLUSION

As a research team, we studied how high school background affects course selection and how students gather information to make those decisions. We see from a combination of survey and interview results that students from public schools less prepared than their private school counterparts. This “hidden curriculum,” which spans course offerings and instructional organization, provides oft-unseen barriers which are particularly prohibitive at the start of a student’s academic career. When it comes to student choice, differences between public and private students are blurrier. Students tend to be most constrained by graduation requirements and scheduling issues, with additional factors serving as extraneous if these are not fulfilled. Moreover, students collect information about courses in a variety of ways: the presence of formal support structures mandated by the university tends to provide students a similar baseline, though advising in particular varies widely between students and many choose to complement this information with informal peer networks. We synthesized these complicated testimonies into a set of three general course selection strategies which we name at the end of our analysis.

From these findings, we set forth a set of recommendations to guide university policymakers. They are as follows:

1. *Focus on the first- and second-year experience*—students, especially those from underrepresented backgrounds, noted that the transition to college was the toughest period of their academic career.
2. *Revisit class blocking and scheduling*—the current timing of classes means many students have to choose between meals or athletic commitments and courses, a trade-off which leaves them either physically less healthy or academically unfulfilled.
3. *Revamp early advising*—providing advisors a set of resources and training (for example, a primer on academics in the first year and contact information to fill in gaps in an advisor's knowledge) would reduce the disparities in advising.
4. *Improve universally-used tools*—students almost all consulted the Q-Guide, and many expressed sentiments that the user interface feels outdated or prone to technical issues. Integrating the features of lesser-used tools and updating the Q would probably have the most impact on the student body.

It is important to note some of the limitations of our studies. One key limitation is that there is always a tension between breadth and depth of our information-gathering. There are myriad academic paths: some students switch concentrations, others transfer into Harvard and never experience a first year, still others take time off or take certain requirements through other institutions. Similarly, there is great complexity of experience within the public and private school categories, which we were able to see even from the interviews we conducted. Though we cleared the threshold standards for number of respondents, we weren't equipped to encompass all of this heterogeneity given our resources and time constraints. Additional limitations arise from the nature of our project. As a semester-long project, we gauge student experiences a few months after the last time they have made course decisions, and we are not able to closely follow them over multiple iterations of selection. Our study captures information at a specific moment but doesn't perfectly model the fluidity and changing factors involved in student choice. Finally, though we noted this in our research design, it is important to note that our observations are highly specific to this institution. Although this methodology can likely be repeated in different contexts, one should be careful trying to universalize any results from just Harvard subjects.

The end of every research study is the beginning of a new one, and this work directly informs potential future directions. One future direction would be looking more specifically at the experiences of first-year students who had fewer resources in high school and identifying the sorts

of information that they think would have made them best prepared for their ensuing academic career. It is clear from our interviews that this period of time houses the largest gaps in academic experience. Another direction would be better understanding advising, particularly peer advising which was not highly discussed in our interviews. Considering that students use both formal and informal advising networks, peer advising sits in an interesting liminal space, and it would be fascinating to understand how students are reacting to losing this important, accessible source of information. Finally, it would be interesting to longitudinally follow a certain set of students as they progress along an entire academic career. It was already evident from our interviews that students think very differently about course selection after certain events have passed: choosing a concentration and finishing certain requirements as examples. Knowing when certain resources are the most useful could help tailor resources to students at different points in their careers. Though these are the most logical next steps, other topics for future research groups also could include investigating preparedness of international students and evaluating how students of different backgrounds enroll in different class formats such as seminars (provided in supplemental figures). Though we began these analyses and found some fascinating preliminary data, they ultimately fell outside our project scope and would require more resources to fully understand.

In all, our project begins to address the question of why students choose. We show that students factor in complex considerations, consult a variety of sources, and are influenced both explicitly and implicitly by the communities they grow up in. We hope that our work is able to contribute to a broader body of knowledge which seeks to use how we make decisions to improve the experience and educational outcomes for our students.

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