

Concentration Selection by First Generation College Students at Harvard College

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GENED 1039: Higher Education: Students, Institutions, and Controversies

December 2019

We affirm that we have abided by the Harvard College Honor Code in the completion of this assignment.

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Abstract

Our project investigates the concentration choices of first-generation students at Harvard College and the motivations behind their concentration choices. We hope that with the help of our findings, the Harvard administration can improve the undergraduate college experience to lower barriers of entry for first-generation students in choosing concentrations and make the academic process more equitable for all. We acquired institutional data illustrating the number of first-generation students in each concentration. In addition, we conducted twelve interviews, with a mix of sophomores, juniors, and seniors, to understand why and how they chose their respective concentrations. We found that the first-generation population was underrepresented in engineering and applied sciences and overrepresented in the sciences. Our interviewees noted that post-graduate outcomes, poor quality of advising and support at Harvard, and relationship with family and community back home were the three biggest factors in their concentration choices. We recommend that Harvard rethinks access to quality first-year advising, develops better introductory courses, improves mental health resources, increase faculty diversity and representation, and incorporate a full summer-bridge program to introduce students to resources on campus.

Introduction

Education – and particularly higher education – has long been touted as the key to bettering one’s life and the generations to follow. For decades, the fundamental promise of higher education was one of social mobility. With the passage of the GI Bill, the American university opened to a new type of student outside of the elite. The program was deemed a wild success and the narrative of college as a mechanism for upward mobility was born (Olson, 1973). However, more recent research calls this assumption into question. Studies have revealed that despite efforts to promote social mobility, elite universities still accept far more wealthy students than low income students. Furthermore, wealthy students are still benefiting more from the higher education system than poor students are. Research seems to show that elite higher education institutions are failing to give educational access to low-income students, preventing the facilitation of upward mobility. Harvard is no exception to this rule. In 2017, the *Harvard Crimson* reported that the median household income of undergraduates is \$168,000, more than three times the national average (Flanagan & Xie, 2017). Despite efforts by the Harvard Financial Aid Initiative to make Harvard financially accessible to all those who apply, it is clear that Harvard still predominantly serves the wealthy. This lack of access means that instead of contributing to social mobility, institutions of higher education like Harvard may actually play a role in perpetuating inequality and reinforcing cycles of poverty.

Though statistics clearly indicate that there is unequal access to institutions like Harvard along class lines, little has been done to study the choices of the few low income and first generation students who manage to penetrate the world of elite higher education. When addressing questions of social mobility at a school like Harvard, it is essential to look into the choices of first generation students as they represent one of the few opportunities for upward mobility in a world predominantly filled by those who are already a part of the upper class or whose parents have attended college before them. While there is not a perfect overlap between the first-generation population and low-income populations at Harvard, our literature review reveals a variety of distinguishing factors which make first-generation students unique from their continuing generation peers. Often these first-generation students have a variety of considerations to keep in mind - from family and community expectations to the desire to increase earnings and opportunities from what was available to their parents. Even higher income

first-generation students feel a certain pressure to achieve a status-form of upward mobility for their families.

One of the most impactful decisions that students make during their time in college is their choice of major or concentration. This decision often influences future earnings and job potential, and it may serve as an indicator of a student's values or priorities. Yet for first generation students, there are often barriers to entering the field of their dreams- either because of pressure to achieve upward mobility, or because of a lack of knowledge required to enter certain fields. Thus, this has led to our research question: What social or institutional factors restrict first-generation college students in their choice of concentration at Harvard College? Our research endeavored to answer this question through disaggregated institutional data on concentration selection and interviews with 12 first-generation college students at Harvard.

This research has found that certain departments at Harvard overrepresent first-generation students while others underrepresent them. However, sheer numbers alone do not tell the full story. Our interviews revealed the complex decision-making process which drove each concentration decision. Our interviewees were worried about post-graduate employment and creating upward mobility for their families. They felt pushed out of certain concentrations by knowledge barriers or poor mental health accommodations. But most of all, many felt lost during their first few years as they made critical decisions that would inform the remainder of their time in college. Regardless of the important realities revealed by quantitative analysis, there is so much beneath the surface which dictates the choices and constraints placed on first-generation students. It is armed with this knowledge that we offer conclude this paper with recommendations to the College to improve accessibility to all concentrations so that every student, regardless of their parents' education level, may go into the field where their passions lie. In the spirit of a fairer and more egalitarian Harvard experience, we pursued this line of inquiry so as to better our community and perhaps, given Harvard's status in higher education, the communities of colleges across the nation.

Literature Review

The Role of Higher Education in Social Mobility

Despite higher education's promise to create social mobility for low-income or first-generation students, the literature reveals a reality which is much less optimistic. Robert

Haveman and Timothy Smeeding's (2006) "The Role of Higher Education in Social Mobility," explores the modern fallacy of upward mobility in higher education. The authors contend that although the ideal of higher education is a system which creates a meritocracy to prevent one generation's wealth from directly determining the next (Haveman and Smeeding, 2006, p. 127), the reality of higher education today is that top tier colleges today accept far more upper class students than lower class students, and that despite the raw number of people attending higher education institutions increasing, this increase has still benefited the wealthy more than low income individuals (Haveman and Smeeding, 2006, p. 130). In fact, they find that despite there being many qualified low-income students, universities still overrepresent wealthy students (Haveman and Smeeding, 2006, p. 133). Because higher education institutions, especially elite institutions, are failing to live up to their promises of being mechanisms of upward mobility, it becomes increasingly relevant and necessary to investigate the choices of the few low-income and first-generation students who do manage to be admitted into elite universities.

Choosing a Major

Throughout the literature, three major hypotheses emerge regarding how college students choose their major. Germejis et al. (2012) take a person-based approach, arguing that choosing a major is done through a period of self-exploration and exploration of environment. Meanwhile, Pitt and Zhu (2019) take a less theoretical lens than Germejis, arguing for an outcome-driven model where future prestige and status have a large influence on a student's decision of major. Taking a survey method, their paper asked students to evaluate the worth of their respective major as a function of three variables— post-baccalaureate income, attainment of advanced degrees, and occupational prestige— and found that students correlated occupational status with high status of majors the most. Finally, Nahum Medalia (1968) takes a department-centered approach, arguing that that the way a student chooses a major is just as much about the student as it is about the way certain departments present themselves. Medalia argues that the perception or reputation of a department also influences major choice regardless of a student's true interests. All of these findings lend some understanding of what leads students to choose a specific major, but none focus explicitly on first-generation students.

Some researchers have directly explored how first-generation college students choose a major. In a general sense, studies find that first-generation students are overrepresented in the social sciences and business majors (Manzoni and Streib, 2019). Different researchers employ

varying methods to discover more specific information about this topic. For example, Sam Trejo (2016) adopts an entirely quantitative approach of looking at the choices of first-generation students. Using survey data to investigate the major choices of first-generation college students, he finds a statistically significant positive relationship between being a first-generation student and choosing majors which have higher wages, lower unemployment, and higher job security (Trejo, 2016, p. 2). Thus, his findings most closely align with the Pitt and Zhu hypothesis. Meanwhile, Rebeca Burnett's 2017 research dissects the decision-making process of first-generation college students through interviews. She takes a more qualitative approach, splitting decision-making factors into internal and external motivations. Specifically, she describes internal motivations as knowledge of one's strengths, interests, and past experiences, and external motivations as professional motivations, practicality, and post-graduate goals. She concludes that not as many students choose majors based on expected income as past studies had indicated, and that all first-generation students interviewed had a sense of self-motivation, self-knowledge, and self-awareness, thus falling a bit more in line with Germejis et al.'s hypothesis. Our research aims to expand upon Trejo and Burnett's research by employing a combination of quantitative and qualitative methods to explore not only which majors first-generation students choose but also what social factors influence that decision.

The Psychology and Circumstances of First-Generation Students

The literature reveals that the circumstances facing first-generation students are somewhat distinct from their continuing generation classmates. Hérbert et al. (2018) find that first-generation students often faced unique difficulties during their adolescence, such as financial stress, serious health issues and familial dysfunction. Ultimately, supportive K-12 educators, relationships at university, and high parental expectations contributed to these students' success at college. But while parental expectations may be central to success, both Palbusa and Gauvain (2017) and Marcia Fallon (1997) find that first-generation students frequently receive less instrumental support or advice from their parents while entering college than continuing generation peers. Additionally, Palbusa and Gauvain (2017) find that first-generation students receive lower GPAs in their first year of college while Terenzini et al. (1997) find that first-generation students were less prepared for college in terms of their abilities in math, reading, and critical thinking as reflected in the exam administered at the start of college. Together, all of these academic, social, and familial factors combine to create unique

circumstances for first-generation students as they enter college and throughout their first year. These circumstances likely play an important role in how first-generation students choose their major.

First-generation students are not only more likely to have faced difficulties in the past; they also face unique challenges once they arrive at college. Studies have found that imposter syndrome and feelings of social isolation – both from peers at university and from family back home – disproportionately affect first-generation students (Stuart, 2012; Garriot et al., 2015). The ways that they surmount these challenges are numerous. Through a series of qualitative interviews, Demetriou et al. (2017) noted that getting involved with a community on campus through student organizations or community service, as well as studying abroad or participating in faculty-mentored research, resulted in first-generation students overmounting obstacles and achieving success in college. Thus, not only do first-generation students experience unique circumstances prior to entering college, they also encounter a distinct set of difficulties upon entering college.

Heterogeneity Across First-Generation Students

Some considerations we must entertain upon entering this field of research include thinking about the heterogeneity of the first-generation student population, as well as the intersectional factors that contribute to their choice of concentration. Kim et al. (2018) have noted that first-generation students are not a homogenous group. For example, some first-generation students may have guidance from older siblings who attended college. This is important to remember when drawing conclusions about a group as a whole as some of these conclusions we draw may not apply to the population as a whole. Further, we must consider the intersectionality of each student's identity that goes into their concentration decision. Things such as documentation status, specific demographics, familial background and expected job prospects all factor into each individual's choice of study (Nores, 2010).

Ultimately, the literature reveals a deep interest in the first-generation student experience. However, no empirical work directly explores the factors leading up to each first-generation student's choice of major, and little research has holistically encapsulated the intersectional experience of each first-generation student. With our Harvard case study, we are bringing a unique combination of quantitative and qualitative research. We will look at the relevant data via our quantitative research methods, but we will also do extensive qualitative research via

interviews in order to get the full context of each first-generation student's concentration choice. In this way, we hope to pinpoint the social and structural context which informs (and restricts) first-generation students at Harvard, either confirming or expanding upon existing hypotheses surrounding concentration choice.

Data and Methods

For our research, we acquired institutional data from the Harvard College Office of Institutional Research (OIR) showing the percentage of first-generation students in each concentration at Harvard College in the sophomore through senior classes. We also acquired qualitative data through interviews with 12 first-generation students to better understand their motivations for choosing their respective majors. These students also ranged from the sophomore to senior class, and they were members of a variety of departments across the college.

We started by requesting quantitative data through the OIR on first-generation students' concentration choices. Our goal was to gain insight into trends of first-generation students who had already declared concentrations. As opposed to a survey, institutional data gives us a fuller picture of the relationship between concentration choice and first-generation status it contains information on all students, thus being representative and accurate of our target population. The institutional data only provides concentration decisions for sophomores, juniors, and seniors because first-years have not yet declared and thus are not included in the dataset. The benefit of getting internal university data is that it provides a complete picture of all students who have declared concentrations. Meanwhile, with a survey, we would have to take into consideration the accuracy of results and if the results of our sample are representative of the population as a whole. The institutional data guarantees no biases and complete objectivity and accuracy in this respect. We then ran statistical analyses to determine whether first-generation students were over or underrepresented in certain fields compared to others. We were able to compare the percent of first-generation students in each concentration with the percent of first-generation students at the college more broadly to determine the statistical significance of our results.

While quantitative data paints a clear and accurate picture of the overall trends in concentration choice of first-generation students, it is insufficient to truly shed light upon the multifaceted nature of the first-generation college experience. Trends in concentration selection among first-generation college students provided an important starting point for our research in terms of understanding the current landscape of concentration selection. It also informed our

other lines of inquiry moving forward. However, we also conducted interviews with 12 first-generation students at Harvard to fill in the gaps that data alone cannot speak to. Because concentration choice is closely tied to post graduate outcomes and therefore social mobility, understanding the decision making process and personal motivations of first-generation college students was critical deepening our understanding of the first-generation experience at Harvard. A more thorough understanding of thought process and rationale, which could only be acquired through interviews and qualitative analysis, lead to our concrete policy recommendations and measures that can be taken to make the Harvard experience fairer and more egalitarian for all students regardless of the level of parental education. Given Harvard's position in American higher education, the policies enacted by this institution may influence others around the country, providing the potential to not only improve the experience of first-generation college students at Harvard but also the first-generation college experience across the nation.

Given that the purpose of our interviews was to understand the factors that influence concentration selection among first-generation students, a significant portion of our questions were based on the trends we observe in the data. Only once we understood the tendencies of Harvard students in concentration selection could we begin to construct a careful examination of the factors that may influence the selection process. Our interviews followed a general structure to ensure uniformity in our data collection and in order to increase the likelihood of collecting data that can support our understanding of how first-generation students at Harvard choose their concentration [for more information see the basic list of questions attached in Appendix]. Our research group also followed a certain set of procedures to ensure uniformity across interviews, namely the researchers collecting the data disclosed their personal choice of concentration or their first-generation status during the course of the interview. This was in an effort to ensure participants did not feel pressured to answer questions in a certain way or to share similar views to the interviewer according to backgrounds or academic interest.

To recruit first-generation students to participate in our interviews, we sent emails to Dunster House and Pforzheimer House to recruit first-generation student volunteers. Because the number of interviewees who volunteered through this relatively random opt-in process was not sufficient to reach the 12 person threshold, we also tapped into our social networks to find volunteers for interviews as well. In total, we were able to recruit 12 interviewees across the sophomore, junior, and senior classes in a variety of concentrations. We ultimately had 3 seniors,

6 juniors, and 3 sophomores. We had 4 participants in concentrations in the Social Sciences, 2 participants in concentrations in the Arts and Humanities, 3 in the Sciences, and 3 in Engineering and Applied Sciences. All divisions according to discipline were made according to the distinctions provided by Harvard College. Though our interview numbers were not perfectly reflective of our institutional data, these numbers allowed us to gain insight from first generation students across various fields at the college. To see more information about the interviewees selected and their concentrations, see the Appendix.

One important condition of the interviews was that the participants had to be in their sophomore year of college or later. This policy was necessary because at Harvard College, students are not required to declare a concentration until the second semester of their sophomore year of college. Many freshmen at Harvard College have not fully begun the process of choosing a concentration, so freshman respondents may not be able to answer questions about the thought process or rationale behind their choice in concentration. Additionally, the data collected from the University only represented the sophomore through senior class, and in order to ensure consistency between quantitative and qualitative data, first-years were not included in our interviews. Ultimately, each researcher took on about an equal number of interviews, and each interview lasted for at least twenty minutes in a private space chosen by the interviewee. This assured privacy and allowed the interviewees to be completely honest while answering questions. Interviews were not held in the individual dorms of our researchers in order to ensure that the researcher and interviewee may approach one another on a level plane. All interviews were audio recorded with the consent of interviewees, and all interviewees will be assured of their anonymity in the publication of research. Any respondent not willing to speak on the record will not be included as a part of our data. For consent forms or interview transcripts see the Appendix.

Because the goal of our interviews was to deeply understand the thought process of individuals, it was essential that our respondents felt free to express themselves as authentically as possible. Every interview began by informing the interviewee that we would like their consent to audio record the interview and that they may choose to stop the interview at any time. Additionally, any interviewee was allowed to contact us within 72 hours of their interview if they decided that they would like to have their interview scratched from the record. We honored all requests to opt out of the study even after the interview if the respondent felt they would prefer to

no longer be included in the study, though this did not occur. Additionally, we allowed interviewees to strike any of their statements from the record following the interview. Because our respondents were primarily strangers, we started with basic demographic questions to put the interviewees at ease (these questions include where they are from, what dorm they live in, what they are studying, and what extracurriculars they are a part of). In addition to providing context on the individual, these questions helped to free our participants of any uneasiness. After the preliminary questions, we asked questions about the individual's process of concentration selection. These questions included the extent to which a number of social (familial influence, peers) and institutional factors (post-graduate outcomes, academic advising) have influenced their concentration choice. A more complete list of questions we will ask is in the Appendix, however, we allowed flexibility to our researchers to ask additional questions (or to not ask questions) depending on the answers given by respondents. This system was meant to provide some level of consistency between interviews while allowing room to learn more about anything unique shared by a particular interviewee.

Positionality

Our four person research group is diverse across many categories including race, gender, religion, first-generation status, legacy status, class year, and choice of concentration. We hope this diversity will allow our group to check each other's biases and will minimize subconscious tendencies that any one individual may have. By crafting our interview and survey questions as a group, each individual had the opportunity to contribute their unique perspective on bias and to comment on potential areas of consideration another group member may have missed. For example, as one member of our group identifies as first-generation, they were able to format our outreach in questions in such a way that the project respected and learned from first-generation students rather than taking advantage of their time for our own benefit. One significant way in which our group lacks diversity is that we are all Harvard undergraduates. As students of Harvard College who are studying Harvard College we are in a unique position to have special insights into the Harvard experience as well as certain blind spots— aspects of our experience that are so normal to us we are unable to identify them. In order to combat the potential biases this may introduce to interview questions and research structure, we received feedback from Professor Klemenčič and course teaching fellow Nicolette Bardele. By leveraging the diversity

of our research group as well as resources outside the university, we hope to minimize the effect of our individual identities on the product of our research.

Findings and Analysis

Quantitative Analysis

After successfully retrieving information from Harvard's Office of Institutional Research, we used data on the distribution of students across concentrations to guide the direction of our research. Although we had hypotheses about trends we may see in concentration selection based on our analysis of the literature on this subject, we refrained from making any assumptions about the Harvard student body until our analysis of the Harvard data was complete. The data given to our research group by Harvard's Office of Institutional Research anonymously linked the first generation status of students to their choice of concentration. The data contained the concentrations of sophomores, juniors, and seniors enrolled in Harvard College during the 2017-2018 academic year. The data included all declared concentrations of enrolled students as of December 21, 2018. December 21st falls after Harvard's November 21st deadline for concentration declaration, which ensured that our data also included the declared concentrations of sophomores. Students at Harvard do not declare concentrations their freshman year, so they are not included in the given data and accordingly freshman were not contacted for participation in our interview process.

A broad analysis of the data found that first generation college students made up 14% of the Harvard College student body. This figure is consistent with demographic surveys of each incoming class published by *The Harvard Crimson*.

Due to the large number of concentration choices available at Harvard(50 official concentrations not including special concentrations), analyzing the first generation status of students by concentration proved ineffective. For example, the Earth and Planetary Sciences Concentration contains 21 declared undergraduates, none of whom are first generation students. Given the null hypothesis that first generation status has no impact on concentration selection, we would expect that first generation students make up 14% of the 21 students or approximately 3 out the total 21 students. The fact that there are 0 first generation students in Earth and Planetary Sciences means that first generation students are underrepresented in the concentration but it does not necessarily mean that any force is acting to cause this underrepresentation. In other words, the fact that there were zero first generation students in Earth and Planetary

Sciences instead of 3 students could easily be due to chance, which prevents us from rejecting the null hypothesis.

The logic presented above is upheld by our statistical analysis and is relevant to many of Harvard's concentrations which contain small numbers of students. We conducted a Z score test for 2 population proportions for each of the 50 concentrations. Out of the 50 concentrations only a few gave Z scores greater than 1.96, meaning that only a few concentrations contained significant data with a p value of 0.05. In a group as large as 50 it is possible that some Z score tests are false positives. Over 50 tests, it is possible for the Z score test to return a significant result even if the distribution is indeed random. In order to illuminate more widespread trends, we choose to group Harvard's concentrations into the academic disciplines outlined by Harvard College. According to Harvard's webpage on concentration information, each of the 50 concentrations falls under one of the following categories: Engineering and Applied Science, Sciences, Arts and Humanities, and Social Sciences.

If first generation students choose a category of concentration at random and without any exterior social or institutional pressures, we would expect that they make up 14% of each category. This predicted or assumed distribution of first generation students is depicted by the orange bar in Graph 1. If first generation students are not hindered by outside pressures they should make up 14% of each division. However, we found that this predicted distribution was not present within Engineering and Applied Science and in the Sciences where first generation students made up 9% and 17% of the divisions respectively. This deviation from the expected distribution was confirmed with a Z score test for two population proportions for each of the divisions. In the Arts and Humanities and the Social Sciences the representation of first generation students was roughly proportional to the representation of first generation students across the student body.

This overrepresentation of first generation students in Science and underrepresentation of first generation students in Engineering and Applied Science does not immediately indicate the presence of external factors on the process of concentration selection. For example, it is feasible that the lower than expected representation of first generation students in Engineering and Applied Science is caused by a University wide trend where students over all are less likely to choose an engineering concentration. Graph 2 shows the proportion of first generation students in each division relative to the overall number of first generation students compared to the

proportion of non first generation students in each division relative to the overall number of non first generation students. This comparison of the relative proportions between first generation and non first generation students accounts for the reality that certain divisions are more popular across the student body. Even in this comparison of relative proportions, first generation students were noticeably more inclined towards the Sciences and were noticeably absent in Engineering and Applied Science. In the Arts and Humanities and the Social Sciences, the proportion of first generation students selecting into these divisions mirrored the proportion of non first generation students selecting into the divisions, possibly indicating that access to concentrations in these fields is more equitable.

With these fact based insights we began the formulation of our interview questions. We aim to illuminate the ways in which the individual experiences of students supported or contradicted the data we received.

Qualitative Interviews and Analysis

Our twelve qualitative interviews highlighted patterns which allowed us to answer our initial research question holistically:

The first factor that restricts first-generation students in their concentration choice is **potential future earnings and job security**. 9 out of 12, or 75% of our interviewees noted that they looked at concentrations in terms of something like future “economic stability” and “postgraduate opportunities” (Castillo-Sahagan & Zhou, 2019, Interviews). Some even called their concentration choice 100% or “entirely” determined by “graduate employment” (Aquino, 2019, Interview). This factor caused students to choose what are generally seen as concentrations with more hireability, which are usually in STEM fields or are STEM-related. Students studying STEM fields also found that the concentration requirements led more smoothly into a sustainable and well-paying employment opportunity. One student concentrating in Environmental Sciences & Engineering noted that the concentration had a “title of the job already attached to it” (Thrush, 2019, Interview). Students who chose the humanities were still concerned with postgraduate economic opportunity, with several citing law school or graduate school as a safe option upon graduation. Some interviewees even noted that they specifically chose the concentration they did over another for hireability post graduation.

Secondly, confirming Palbusa and Gauvain (2017) and Marcia Fallon’s (1997) findings, first-generation students receive less practical support from their parents back home. Most

interviewees said their parents were not really familiar with the process of choosing a major in college, which resulted in less constructive guidance than some of their peers received from their parents. When talking with her parents about her concentration choice, one interviewee said, “I don’t know if anything really communicated” (Chavez-Espinosa, 2019, Interview). Others said they wished they could have received more “strategic” advice from back home (Bahar, 2019, Interview). **Parents’ lack of familiarity with college** thus informs and restricts first-generation students’ concentration choices in various ways. It causes some students to rely solely on advice from friends, and it causes some to drift between concentration choices, feeling lost about which one is right for them. Other students noted the importance of the advice from siblings who attended college prior.

Third, an institutional factor at Harvard College which informs and restricts concentration choice for this demographic is **poor first-year advising**. Most interviewees cited unhelpful or even disadvantageous advice received from first-year advisors which influenced their academic trajectory at the College. Some students said the advisors were too lax and allowed them to figure things out on their own, which made them feel like “there wasn’t enough support” (Castillo-Sahagan, 2019, Interview). “I reached out to my advisor,” said S. Beattie, “but, like, he wouldn’t talk to me about anything until like right before the deadline, which also made me panic...and then [the] advice was ‘ah you figured it out. Good job.’” Another student said that she was taking classes which most first years did not take, such as Organic Chemistry, because her advisor approved it without mentioning that most viewed these courses as very high-level. Subsequently, it created a very stressful first year for the student and caused her to switch out of her intended STEM major. While some interviewees had adequate first-year advising, the experience seems to be highly inconsistent with some advisors actively harming the quality of their advisee’s first year in college. As per our prior finding, because of a lack of academic support from home, many students will rely on advising. When advising falls short, students are forced to turn to friends and classmates, many of whom are untrained and can only speak on personal experience or the experience of their family. Additionally, students noted that first-year advisors did not have strong advice on post-graduation employment, and they lacked knowledge about some of the resources available at Harvard. Student Z. Zhou notes on academic resources at the college, “They provide them if you ask for them. The key is that like if students don’t know how to ask, you don’t get it.” First-generation students in particular often need help accessing

resources and choosing course-loads. When our first-year advisors are failing to meet those needs, first-generation students are put at a disadvantage compared to peers who may be able to seek advice from parents or family.

The fourth factor which restricts first-generation students' concentration choices is **math and science inaccessibility**. Supporting our quantitative finding that first-generation students are underrepresented in engineering, many interviewees cited that there were barriers to entry in concentrations that were heavily math or science focused. In his classes at Harvard, Z. Zhou remembers feelings like "everything was fresh and new...I had never seen this stuff before," and that it was "kind of strange...that a lot of kids in the class knew the material already." Another interviewee, K. Aquino, cited math inaccessibility as a reason she felt she could not pursue her intended concentration, computer science. "It's very misleading when people say 'oh, I've never had experience before,' [in classes like CS50], because they definitely have," she says. Theoretical Computer Science, she maintains, is definitely related to high-level math that some have previous exposure to. P. Bahar noted that in the sciences, "there aren't intro classes in a lot of concentrations... if you aren't ready to just dive in on the content, like you don't get that introduction." Ultimately, professors in the respective departments often do not realize that not everyone starts out on the same playing field, and this causes some first-generation students to feel like they can never catch up, and subsequently come to see certain concentrations – especially within math and the sciences – as inaccessible. Z. Zhou further stated that the overrepresentation of first-generation students in the Sciences and underrepresentation in Engineering and Applied Sciences can be explained by the effort on behalf of first-generation students to find the balance between postgraduate security and barriers to entry, "If you're a first gen student, sciences represents... a good way of upward mobility or even like stability... But in terms of, I think, CS and SEAS, I believe it to be the knowledge barrier... If you have no experience in CS, if you've never done an internship before, if you don't know how even to get your feet wet. It is a struggle to get started." Ultimately, first-generation students desire a field with strong job security, but they often feel pushed out of fields which interest them because they are not coming in with the same skill level as their continuing generation peers may be.

Additionally, a **lack of mental health resources** contributed negatively to the decision-making involved in first-generation students' concentration choice. When the fundamentals of one's health and wellbeing are not being met, it is very hard to focus on excelling academically.

When one interviewee was asked what single factor could have assisted him when he was struggling with his major, he said “mental health resources would have been great” (Palmer, 2019, Interview). Further, the concentrations that specifically offer health and wellbeing accommodations are especially attractive to first-generation students. To paint a picture, L. Veira-Ramirez’s switch from Chemistry to History & Literature was motivated partly by the fact that courses and professors in the Chemistry department seemed to lack concern about mental health. During her first year at the College, the results of the 2016 election bore serious effects on her mental health, and her request for an extension in a STEM class was met with an unsympathetic response. In History & Literature, there are extension days built into the syllabi, and she found professors to be far more accommodating.

Finally, **faculty-student interaction and diverse faculty representation** played an important role in first-generation students’ concentration choices. Many students cited that they felt supported when they saw faculty in their respective departments that “looked like” them (Veira-Ramirez, 2019, Interview). “If you get into a place,” says P. Bahar, “and you don’t see anybody like yourself, it’s tough to say, ‘oh yeah, this makes sense for me.’” One interviewee concentrating in environmental engineering claims “there aren’t enough people that represent my background and my identities here at Harvard as faculty” (Castillo-Sahagan, 2019, Interview). Factors like this resulted in uncertainty in being able to complete the concentration requirements and plans going into the future, to the point where she admits she left engineering for a semester as she believed there was not enough support for her. Another student noted that the lack of representation in the department impacted not only her experience, but also the research being produced, “All of my psych classes I’m the only black person in them... the way they approach to research in marginalized communities is so like invasive and it’s like... you can’t even fathom like being empathetic or something” (Anonymous, 2019, Interview). However, in departments where students did feel like they had a personal connection with faculty and teaching assistants, who showed that they cared and were looking out for them, they were more inclined to gravitate toward certain classes and fields.

Limitations

As with any research project of this scale, there are certain limitations to the amount and type of data we were able to collect which may impact our findings. However, despite any

limitations we believe that the information drawn from our data and interviews is valuable data that paints a rich picture of the first-generation experience at Harvard. That stated, particularly in our interviews, the population we were able to survey was not randomized. After emailing house lists, we had acquired an insufficient number of interviewees to fulfill the requirements of this course. Thus, Starr and Adelle tapped into personal social networks to acquire additional interviewees. Because of this, the junior class is over-represented in the interview population given that Starr and Adelle are both juniors. This overrepresentation of juniors is important to note mainly because juniors are in a different place in their academic careers than either sophomores who are new to their concentrations or seniors who are looking for jobs and closer to graduation. However, because we were still able to interview at least 3 students from each class year, we do not believe that this skew towards the junior class will undermine the quality of data collected. Additionally, Starr ended up interviewing two of her roommates which skewed the dataset towards the social sciences. She also had pre-existing relationships with these two interviewees, and it is possible that the data received through these interviewees differs from that which may have been acquired by a stranger. However, we believe that because these interviewees were comfortable interviewing with Starr, they may have been more rather than less open. Because our data showed that first-generation students were underrepresented in Engineering and Applied Sciences, we purposefully sought out interviewees who were in this field and were able to speak to some of the barriers which exist in this field. Once again, this impacts the randomness of our sample which may mean that our interviewees are in some way less representative of the first-generation population more broadly.

It is also important to note that because this study was conducted with a sole focus on undergraduates from Harvard College, results may not be generalizable more broadly. Harvard is a unique environment which places specific pressures on first-generation students because of its prestige and history. However, Harvard also has one of the most generous financial aid programs in the country which may reduce financial stress. Additionally, while Harvard undergraduates may feel a greater pressure to succeed after graduation, they also have access to postgraduate opportunities (regardless of concentration) that many students at other universities may not have access to. Our recommendations and findings are specific to Harvard College. While there may be some best practices which could be helpful more broadly- such as a bridge program or

improved advising- these recommendations were specifically crafted with the first-generation population of Harvard in mind.

Conclusion and Recommendations

This paper reveals several important findings surrounding the concentration selection of first-generation students at Harvard College as well as the barriers and limitations which push students into one field over another. We learned from the quantitative data that first-generation college students are overrepresented in the Sciences and underrepresented in Engineering and Applied Sciences. This was explained by our interviewees as finding the balance between career security and the barrier to entry in certain fields (Zhou, 2019, Interview). Along this note, the major takeaways from our interviews were that first generation students were particularly concerned with post-graduate employment opportunities and earnings, students' parents had little familiarity with college which forced them to turn to other sources for information on navigating school, first-year advising was inadequate and failed to introduce students to resources available on campus, many fields (especially in math and science) were deemed inaccessible and lacked introductory courses, poor mental health resources and accommodations had an impact on students' choice of concentration, and lack of faculty diversity caused students to feel out of place in departments, despite loving the content of the field.

Based on our findings, our recommendation to Harvard College are as follows:

- (1) Improve First-Year Advising** - Especially when first-generation students are facing new challenges with less parental support, it is critical for first-year advisors to provide better resources for thriving in a college environment. We recommend that the College provide access to advisors in multiple departments (or have a general humanities/social sciences/STEM advisor). The advisors should also be proactive about reaching out to students and checking in with them on a regular basis or even have a mandatory number of times they must check in with their advisees. They should also have specialized knowledge with regard to first-year course selection, and the difficulty of different courses. These advisors should also be trained on all the resources available at the college- especially those which are pertinent to first-generation students, and they should be proactive about connecting their advisees with such resources. We would also recommend that people not be assigned their proctor as a first-year advisor as this can

blur lines in a way that make first-years feel pressured to accept all advice from their proctor.

- (2) Develop Better Introductory and Survey Courses** - Introductory courses of the “101” nature would make every concentration more accessible to all students at the College. When departments only offer niche courses, it turns away students who might be interested, if they were only given the chance to learn what the subject matter is. It would also be especially helpful in the math and science departments so everyone can be on a level playing field.
- (3) Improve Mental Health Awareness, Accommodations & Resources** - Departments must regard all students as holistic individuals, who are holding down complex lives and dealing with all sorts of challenges (often, it is first-generation students who are dealing with especially difficult and complex struggles). If their basic needs are not met with adequate mental health resources, it will be very difficult for students to self-actualize and make the most of their time at Harvard. Therefore, it is critical that the school prioritize access to mental health care by hiring more clinicians at the Counseling and Mental Health Services center, and by incorporating mental health sections into syllabi.
- (4) Diversify Faculty Representation** - When students see people who look like them in a specific department, they are more likely to find a field accessible. This is why an emphasis on diversity within Harvard’s faculty is especially important when attempting to eliminate barriers of entry within specific concentrations.
- (5) Institute a Full-Summer Bridge Program** - Many of Harvard’s peers have already instituted longer programs to acclimate first-generation and low income students to much success. Our qualitative data shows that if students had the opportunity to be introduced to the school over a period of at least a few weeks, it would be highly beneficial. Some of the offerings this program could include are: remedial courses to advance in certain fields, meetings with different departments and learning about the requirements of different concentrations, peer bonding time and introductions to resources on campus and how to access them. It is also recommended that this bridge program happen prior to pre-orientation rather than be a pre-orientation to allow students to pick a pre-orientation program which would allow them to meet a wider array of their peers in the setting which speaks to their interests (outdoors, arts, community service, etc.)

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