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Double Majors

Influences, Identities, & Impacts

September 2012

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A Curb Center Report



The Curb Center
FOR ART, ENTERPRISE & PUBLIC POLICY
at Vanderbilt

Acknowledgements

The authors would like to thank the many undergraduate students who willingly shared their stories with us. All student names in this report are pseudonyms.

We also thank the following colleagues whose generous gifts of time, feedback, and research/editorial assistance made this report possible: Lee Baker (Duke University), Roberta Bell (Vanderbilt University), Annie Bezbatchesko (Teagle Foundation), Joanne Brzinski (Emory University), Wayne Carlson (Ohio State University), Charles Clark (Knox College), Alexis Collier (Ohio State University), Andrew Dell'Antonio (University of Texas at Austin), Carolyn Dever (Vanderbilt University), Theresa Ford (Wooster College), Simon Gray (College of Wooster), Madeleine Green (Teagle Foundation), Stanley Katz (Princeton University), John Kennedy (Indiana University), Heather Kim (Dartmouth College), Heather Terhune Marti (Indiana University), Rachel Martin (University of Texas), Richard McCarty (Vanderbilt University), Russell McIntire (Vanderbilt University), Angie Miller (Indiana University), John Orange (Trinity University), Heather Rippetoe (Vanderbilt University), Diane Saphire (Trinity University), Barry Scherer, (Dartmouth College), Lori Schroeder (Knox College), Ken Spenner (Duke University), Lauren Stavish (Vanderbilt University), and Matt Serra (Duke University).

Special thanks to Bob Conner, Donna Heiland and Cheryl Ching who encouraged us from our first meeting at the Teagle Foundation and who provided insight along the way.

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Foreword

MAKING DOUBLE MAJORS MATTER MORE

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“So, what’s your major?” This innocuous conversation starter works equally well whether coming from a distant relative or a new college roommate. But today, if a parent or guardian asks, the question takes on added significance, and the answer can get pretty complicated in short order. The main reason is economic.

The rising cost of college now threatens to erode the widely acknowledged significant lifetime income advantage to those with a baccalaureate degree. Coupled with one of the worst job markets for college graduates in the past century, this threat is making many students and families think harder about what to expect from the return on their college investment. Part of the decision calculus has always been whether and where to go to college. Today, one’s major field seems to be more important to more people than ever before.

Several decades ago, the majority of undergraduates were encouraged to sample broadly from the curriculum before committing to a major field. To some extent, this sampling was assured by students’ completing required general education courses in the first two years of college, after which they would settle into a field that was a good match with their interests, intellectual orientations, and career goals. Of course, it has always been considered preferable if one can make a comfortable living using the knowledge and skills gained during college. But when economies are growing, knowing more about almost anything—whether directly applicable to a vocational pursuit or not—is worth a premium in the marketplace. Time will tell if the premium will continue to hold. Even so, people are uneasy about how much faith to

put in past performance and whether the law of averages will apply to them.

Against this backdrop, Richard Pitt and Steven Tepper lead us through an exploration of a phenomenon that for quite some time has been in plain sight but effectively ignored: the nontrivial number of undergraduate students completing requirements for two majors. In a fresh contrast with the penchant of the times, they examine the question of “which majors pay off” in terms of desired nonpecuniary outcomes of college. More specifically, they ask, “Are different combinations of majors associated with different patterns of desired outcomes?” Understanding these relationships is important for several reasons.

First, to increase the odds that ideas for improving teaching and learning will take hold in the academy, such efforts must engage the faculty whose professional identity is inextricably linked to their field of specialization—a choice that is not serendipitous. Faculty members (as well as students) tend to choose fields consistent with their personalities (Holland 1997; Smart, Feldman, & Ethington, 2000). Faculty members devote the majority of their time to teaching and scholarship or creative activity that in most cases are connected to their discipline. It’s no surprise, then, that a discipline or field is for all practical purposes a subculture, reflecting the values and norms of its constituent members. As a result, faculty are fiercely protective of their fields when curricular requirements are revised (even the general education component) and when changes are advanced in pedagogical approaches to enhance the quality of teaching and student learning. In addition, for centuries postsecondary institutions around the world have organized their faculties and academic offerings around the study of a discipline or families of similar disciplines. These circumstances go a long way toward explaining the status accorded to the major field in college and university life as well as toward accounting for the difficulty of generating enthusiasm for the general education component of

postsecondary education for which no group of faculty has ownership.

Second, the major field is important to students because of their belief that earning a degree in a particular area will prepare them—at least initially—for work aligned with that major. This is almost certainly the case for those majors tightly connected with the practice of a field, many of which have specialized accreditation requirements, like nursing, allied health, accounting, teacher education, and engineering. For most other occupations, there is precious little evidence that preparation in a particular field is linked with advantages in the workplace, especially when looking across an entire career. Captains of industry come from all majors, as do people who excel in entry-level jobs in various areas. Even the so-called “platinum professions”—medicine, dentistry, and law—are increasingly open to graduates with nontraditional undergraduate majors. For example, high-performing English majors or psychology majors are competitive in medical school admissions, provided they can show or acquire the required basic science knowledge.

To the extent that the major field was once tied in a practical sense to what one did and achieved in one’s post-college vocational pursuits, this is less likely to be the case in the future. Based on an extensive analysis of the nature and evolving demands of current jobs requiring different levels and types of education, Anthony Carnevale (2009), director of the Georgetown University Center for Education and the Workplace, concluded, “Irrespective of college major or institutional selectivity, what matters to career success is students’ development of a *broad set of cross-cutting capacities...*” (italics added). This observation comports with recent reports describing the essential learning outcomes from postsecondary education demanded by the workplace and civic life in the 21st century (Association of American Colleges & Universities 2007; Lumina Foundation for Education 2011).

At first blush, it would seem that students who earn a double major, the focus of this

report, likely gain more from college than single-major students in terms of desired learning outcomes. The logic of this argument, as Pitt and Tepper explain, is that taking courses in one major that differs at least to some extent from a second major in terms of the nature and uses of knowledge (Becher & Trowler 2001) challenges students to accommodate and use different approaches toward understanding, discovering, and problem solving. This, in turn, should result in more opportunities for students to cultivate a capacity for deep, integrative learning—which is manifested, among other ways, as (a) attending to the underlying meaning of information as well as content, (b) integrating and synthesizing different ideas and sources of information, (c) discerning patterns in evidence or phenomena, (d) applying knowledge in different situations, and (e) viewing issues from multiple perspectives. These attributes are considered essential for surviving and thriving in the 21st century economy (Association of American Colleges & Universities 2007). Considering the range in the epistemological assumptions of and approaches to teaching and learning in different fields can help us imagine the intellectual juxtapositions that result when students pursue different combinations of majors.

Biglan (1973) developed a well-regarded framework for examining the characteristics of disciplines pertinent to this discussion (Smart & Elton 1982). Based on a discipline’s assumptions about what constitutes knowledge, the accepted approaches for creating new knowledge, and the methods by and purposes for which knowledge is used, Biglan classified the disciplines into four groups:

1. The hard-pure disciplines—such as biology, chemistry, mathematics, and physics—emphasize universals and simplification and use an atomistic approach to discovery based on logic and facts;
2. The soft-pure disciplines—such as anthropology, economics, literature, psychology, and sociology—are concerned with particular cases and holistic analysis, favoring breadth of intellectual ideas, creativity, and expression;

3. The hard-applied disciplines—such as agriculture, engineering, and computer science—focus on using knowledge for problem solving and developing products and technology; and

4. The soft-applied disciplines—such as architecture, dance, education, and music—focus on personal growth, reflective practice, and lifelong learning to create protocols and procedures.

Faculty members in soft disciplines such as the social sciences or humanities are more likely to discuss alternative or critical perspectives in their courses (Gaff & Wilson 1971; Lattuca & Stark 1994; Nelson Laird, Shoup, Kuh, & Schwarz 2008). They also are more likely to encourage analysis and synthesis, while their counterparts in the hard disciplines require more memorization and application of course concepts (Braxton & Nordvall 1985; Smart & Ethington 1995). Students double majoring in a soft applied discipline, such as dance, along with a hard-pure discipline, such as physics, would encounter very different kinds of knowledge and would be expected to use different analytical approaches to understand and apply knowledge. This is a challenging task, even for people relatively advanced in their cognitive and intellectual development. For students who are not far along in that developmental process, it's quite possible that the interplay between different ways of knowing would confuse rather than enlighten them as they try to accommodate what may seem to be conflicting worldviews. At best, students may cope with such apparent contradictions by selectively choosing when and how to draw on perspectives from one major as contrasted with the other, depending on the circumstances. Many traditional-age undergraduates are not yet capable of making such choices on their own. Pitt and Tepper point to this limitation in reporting the inability of many students to describe cogently how their two majors intersect and how their combination of majors reflects their goals and aspirations.

This limitation may also in part explain why Pitt and Tepper found that certain combinations

of majors produce variable patterns of these kinds of outcomes, but not always in the expected ways. For example, one mildly surprising finding is that more of the “most creative students” had only one major (p. 40 of this report). The creativity advantage was greater for students whose single major was in the arts or humanities. At the same time, science majors reported gaining more in liberal education outcomes when they had a second major, especially one in the Biglan soft-pure or hard-applied areas (p. 45 of this report).

To enhance the impact of double majors on the outcomes that Pitt and Tepper measured, students must develop the capacity for deep, integrative learning—something that is difficult for many students to do on their own. To practice deep, integrative learning, students must be put in situations where they are challenged to think about their own thinking and to reflect on the meaning of what they are experiencing both inside and outside the classroom. They must also be presented with structured situations that ask them to find connections between what they are learning from these different experiences on and off the campus and to apply what they have learned in different settings presenting novel challenges and opportunities. Finally, to benefit optimally, students need frequent, constructive feedback about their performance in these areas.

Taken together, Pitt and Tepper's observations strongly suggest that the responsibility for helping students acquire essential outcomes belongs to the teachers and advisors in students' major fields—whatever they are. To increase the likelihood that students will use the opportunities presented in two majors, faculty members in the respective fields must be intentional about designing assignments that require students to draw on concepts from both.

In common practice, assignments require students with double majors to demonstrate proficiency in each major field individually. A more promising approach to foster deep, integrative learning is to allow students to draw

on both fields—for example, in a culminating experience such as a capstone paper or demonstration—to show that they can integrate, synthesize, and apply key concepts from both fields to develop new interpretations and applications. This ability to make connections and draw fresh insights, as Pitt and Tepper remind us, is an animating feature of creativity and is what productive 21st century economies require of an educated workforce. But we cannot expect students to be able to bring together disparate perspectives and ways of knowing at the end of their studies in a coherent, powerful way if they are not asked to do this and if they do not frequently practice throughout their studies the behaviors that represent deep, integrative learning.

Pitt and Tepper's formidable analysis of the complex relationships between the desired outcomes of college and the various combinations of double majors raises as many questions as it answers. For example, many combinations of majors don't seem to matter much in terms of patterns or magnitude of outcomes. Is this, as I suggested, primarily a function of faculty and advisors not requiring students to make connections between what they have learned in their classes and other experiences across their two major fields? Or are the theorized differences between disciplines that Biglan and others posited no longer meaningful in the learning environments and experiences of undergraduates today? Will the hypo and hyper doubles described by Pitt and Tepper be even more creative and better integrators and synthesizers a year or more after college than they are now? In other words, perhaps the double major experience will have greater impact a year or more after graduation, when students are better able to reflect on, integrate, and apply their knowledge from those fields—the very conditions that might help them gain more from a double major in the first place.

Richard Pitt and Steven Tepper have taught us a good deal about the double-major experience. They've also given us a lot more to think about, which is exactly what I expect of these talented scholars.

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Preface

Interdisciplinarity is viewed by many education leaders as an antidote to the growing trend of hyper-specialization. The idea has spawned new centers, interdisciplinary degree programs, and innovative courses across the nation. This study began with our interest in what we consider an important but understudied version of interdisciplinary learning happening on college campuses today: “double majoring.”

At Vanderbilt University, the number of double majors has risen to nearly 40% of all students. At UC-Davis the number of double majors jumped 50% in five years; it has doubled at MIT since 1993. At Tufts, one-third of the students have a double major; at Georgetown, 23% (an increase of 60% since 1996); at Washington University, 42% of students in 2002 selected two majors (up from 28% five years earlier); and at Brown, 40%.

Several factors might be influencing the rise of double majors: 1) many students begin college with dozens of AP credits, giving them more flexibility to accumulate the required credits for a double major; 2) some students feel like a double major will provide an edge in an uncertain job market; and 3) double majoring is part-and-parcel of the over-committed, over-extended student, a phenomenon that begins well before college. Regardless of the motivation, the rise of double majors is perhaps the most significant trend in the curricular lives of students in the last decade.

Given its scope, it is surprising that universities know almost nothing about the benefits and drawbacks of the double major. With respect to creativity and a liberal education, what is the value added of graduating with two majors? It would seem that certain types of double majors should create the type of Renaissance student that some associate with a liberally educated person – interests in diverse subject matter, curiosity, a willingness to explore, a capacity for integrative

thinking, and scientific and aesthetic reasoning. Many professors acknowledge anecdotally that double majors are often the students they enjoy most because they bring another perspective to the classroom.

But others see the rise of the double major as threatening to a liberal arts education. They question whether students are over-extending themselves and whether double majoring “comes at the expense of worthwhile extracurricular activities.” Others see double majors as being driven by external rewards—like job and graduate school placement—thus reducing the benefit of taking and choosing courses that are intrinsically interesting and rewarding. As one editorial in the Rice University newspaper remarked, “Students will take classes in which they are not interested in order to get an extra word on their transcripts or resumes.”

So, existing conceptual explanations, as well as anecdote and opinion, point to two possible, and contradictory, outcomes: 1) double majoring might improve liberal learning and creativity; and 2) double majoring might detract from and restrict liberal learning and creativity. We believe this research reveals that overall double majors reap positive benefits in terms of creativity and liberal learning. However, some double major combinations produce more integrative learning, more diverse experiences, and more creative thinking than others. Moreover, we argue that there are missed opportunities for universities and colleges to help double majors connect and integrate knowledge across disciplines and that certain “bridge experiences” might help transform what has become an unwitting trend on campuses into a purposeful strategy for fostering creativity and liberal education.

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Executive Summary

Sorting out the benefits and drawbacks of double majoring is a challenging task. This report will demonstrate that double majoring is not “all one thing.” Different students double major for different reasons and *how* they double major can be as important as the fact that they choose to graduate with two majors.

This report draws on a mixed-methods, multiple-dataset approach to analyze motivations, outcomes, and identities related to the growing trend toward multiple majors. Specifically, we used a web-based survey as the principal tool to gather information from approximately 1,760 undergraduate students at nine colleges and universities: two large comprehensive public universities (Ohio State University and the University of Texas), three large comprehensive private universities (Duke University, Emory University, and Vanderbilt University), two medium-sized private universities (Dartmouth College and Trinity University), and two small liberal arts colleges (Knox College and The College of Wooster). The survey targeted students entering their seventh semester of college at each of the participating institutions.

Additional data for this study was drawn from group interviews, or small structured discussions, conducted with groups of eight to twelve students at each of the participating institutions. In order to understand the impact of double majoring on course taking patterns, we also collected a sample of more than 250 undergraduate transcripts.

Finally, in order to understand the institutional origins of and trends toward double majoring, we used the *Integrated Postsecondary Education Data System* (IPEDS), an annual census taken among American colleges and universities. Finally, we explore how double majoring might affect students once they

graduate by analyzing the *National Survey of College Graduates* (NSCG 2003), a sample of over 100,000 college graduates who held a bachelor’s or higher degree in any field as of April 2000.

No single storyline emerges from our research. Overall, we find that most students report that their double major combination fosters interdisciplinarity and integrative thinking. The majority of double majors are motivated by both utilitarian and expressive purposes. Students choose their double major combination because they are interested in and feel personally connected to the subject matter, it reflects their identity and, perhaps most importantly, they think getting a double major will improve their competitiveness post-graduation by bolstering their expertise with complimentary majors (biology and chemistry; finance and accounting; international relations and economics; etc.) Fewer students represent the true Renaissance student who pursues very different subject matters. In fact, only ten percent of double majors in our sample chose to combine a science or engineering degree with an art or humanities degree. This might not be surprising given that faculty themselves rarely cross such seemingly wide disciplinary gulfs.

Nonetheless, the majority of double majors come from two different disciplinary clusters – often combining a social science with either a science major or humanities or art major. These boundary spanners often develop an academic and pre-professional identity that strongly draws upon both majors. They see themselves as biologists and creative writers, or philosophers and mathematicians, as examples. These students point to the promise of double majoring. They report that their two distinct majors reinforce one another; they approach classroom discussion and

assignments by considering the perspective of their other major; and, importantly, many develop compelling narratives for how their two majors fit together. Nonetheless, it is important to acknowledge that students find ways to justify their choice of two majors and to find points of connection and integration without the help of faculty or the institution itself. Some students never reflected on the synergies between their majors until they took our survey or participated in our focus groups. In fact, students who attempted to put integrative learning into practice by designing senior capstone projects (theses or independent studies) that combined their two majors often faced significant barriers because of institutional structures and cultures.

When looking at a broad range of other collegiate outcomes, we find that in most cases choosing two majors does little harm and often some good. Students generally have figured out how to navigate the necessary requirements of two majors without major sacrifices to their extracurricular lives. In many cases, double majoring—especially when one major is a foreign language—facilitates study abroad. Compared to single majors, double majors are more likely to work on independent research with faculty or take honors courses. In addition, double majors generally feel more creative because of their combination of majors. An important caveat to this is that some students in creative majors (art, creative writing, music) feel less creative when they add a time-intensive second major. In these cases, students often report that increased course demands detracts from the necessary time they need to reflect and deeply immerse themselves in their creative craft.

Finally, it is important to point out that the double major phenomenon has important consequences for the humanities and foreign languages. When students couple a humanities or foreign language major with a social science, physical science, education, business or

engineering major, the humanities/foreign language major is often the “second major.” In other words, many students choose a humanistic discipline or a foreign language only after they have a more “practical” discipline under their belts. Were the trend in double majoring to decline (either because of changes in student demand or because of efforts by institutions to make it more difficult to double major), the humanities and foreign languages would likely experience fewer majors and possibly decreased enrollments.

SPECIFIC FINDINGS

1. Double majoring has become an important trend, especially at some of the most selective schools in America. While there has been a slight increase in double majoring on average across all colleges and universities, we see a steep increase (more than ten percent) at the most selective colleges, with many colleges seeing the ranks of double majors swelling to over thirty to forty percent of all graduates.

2. Examining national institutional data, it appears that Black students double major at a far lower proportion than White, Asian, and Latino students. This finding holds up for the nine schools we studied as well. In terms of gender, men and women double major at the same rate. That said, there are substantial differences between men and women in the nature of their double major choices. Additionally, a student’s socioeconomic status can substantially impact whether or not he/she has the opportunity to double major.

3. Double majors are motivated primarily by instrumental reasons. Students are generally interested in picking two majors that complement one another, where there is overlap in requirements, and where the two combined majors better prepare them to be competitive in their careers (including jobs and graduate school). Given the utilitarian purposes of double majoring, double majors gravitate

toward business-related majors; economics and business administration are popular choices.

4. While most students were motivated to choose their two majors in part for practical, work-related reasons, our data suggests that the choice of major is also very much part of students' "identity projects." They choose subjects to which they have a personal relationship, connecting majors to experiences recalled from high school.

5. The humanities and foreign language fields benefit from double majoring. In other words, a greater percentage of students double major than single major in these subjects. Many students choose to add English, history, gender and ethnic studies, and languages when deciding to double major. In fact, foreign languages emerge as, perhaps, the biggest double major story. Only 1.7% of single majors choose a foreign language as their major while 10.5% of double majors choose a foreign language (with Spanish as a popular choice).

6. Many students report that their double major combination helps them think differently, solve intellectual puzzles, and approach assignments more creatively. These gains are greatest when students major in two disparate domains of knowledge, especially combining science with art and humanities. In fact, students report three to four times the level of creative learning in arts and humanities classes compared to coursework in STEM. Thus, the arts and humanities drive double-major creativity gains.

7. Most students indicate they are able to make connections across their majors. However, making such connections is more difficult as students choose subject areas that are more dissimilar (e.g., theatre and chemistry). And, students report that there are few institutional structures set up to explicitly require or encourage students to bring their two fields of knowledge together. Still, many students find creative ways to integrate their majors and provide compelling examples of synthesizing their seemingly disparate coursework.

8. Double majors reflect the "do more, do more" thesis that argues that students who are active in any area of school life (sports, clubs, volunteering, arts) tend to do more in every other area as well (school, attending lectures, studying abroad). Compared to single majors, double majors are more active in extracurricular activities, more likely to be officers of clubs, more likely to participate in volunteer activities such as Alternative Spring Break, more likely to attend lectures outside of class, and more likely to work with faculty on research and do independent/honors research. With respect to student engagement, the double major is positively correlated with liberal arts benefits.

9. Double majoring is not "all one thing." While double majoring can make a difference for some liberal arts outcomes more generally, the more significant differences tend to exist in terms of the degree to which students pick two similar majors (what we refer to as hyper-specialization) or pick two different majors (what we refer to as hypo-specialization). These more narrow definitions of double majoring produce different liberal arts outcomes.

10. Double majors seem aware of the "status" and "prestige" of their majors. Science and economics stand out as the highest status majors (as rated, in aggregate form, by the students themselves); humanities are lower status majors. Interestingly, when double majoring students present themselves and their educational interests to parents and potential employers, they focus on their high status major. When they think about their own "core identity," they are more likely to focus on their lower status major.

We argue that higher education leaders need to understand these dynamics in order to formulate policies that overcome learning obstacles and expand opportunities afforded by double majoring for different groups of students.

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Section 1

Double Majoring – The Phenomenon

WHO DOUBLE MAJORS?

Many studies have considered how students make decisions about their post-secondary educational attainment. Researchers, working from diverse perspectives, have shown that these decisions are shaped in large part by the student’s pre-college social origins, particularly family and educational background. Explanations for the choice of major abound and tend to, like explanations for other educational decisions, take three forms: ascribed characteristics like gender and race (Ayalon 2003; Goyette and Mullen 2006), family dynamics (Lillard and Gerner 1999, Ma 2009), and secondary school opportunities (Frehill 2005; Hill 2008; Simpson 2001; Thompson 2003). We explore these factors below.

Gender and Race. As we can see in Table 1.1, a slightly greater, but statistically insignificant, proportion of men double major than their female counterparts in a national sample of schools. In our smaller sample of more selective schools (see Technical Notes), double majoring is much more common, but the insignificant differences between men and women remain.

In terms of ethnic differences in the national sample, Asian and Latino students do not differ significantly from White students in their tendency to double major; all three groups double major at or near nine percent. Black students, on the other hand, are significantly less likely than Whites (and Asians/Latinos) to graduate with a double major; only six percent of them do so. These trends persist when we focus our attention on the nine-school sample where Asian students are significantly more

likely to double major than their White and Latino peers, while Black students still lag behind all three groups. There are many reasons why Black students might double major at lower rates, including social pressures, lack of mentors, smaller and denser social networks, and differences in college preparedness. From our survey, it appears that Black students are more likely than others to say they did not think they could realistically earn enough credits to double major. And, the data bears this out as Black students, on average, had one-third the number of AP credits at the time of enrolling in college. As demonstrated later, AP credits are strongly correlated with the tendency to double major because, we suspect, they give students more flexibility (more credit hours, more advanced skill sets) to navigate curricular requirements.

Table 1.1 Gender and Race by Double Majors Status

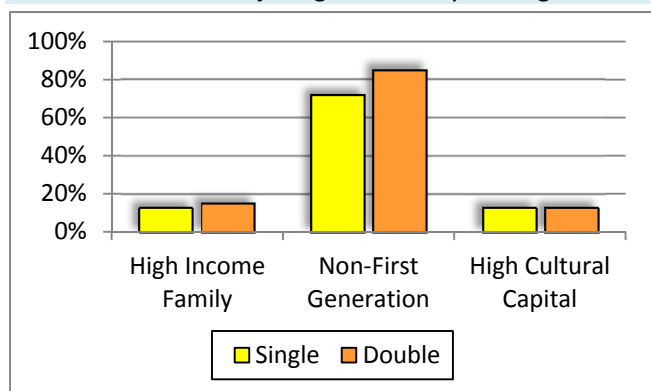
Demographic Category (National Sample, 1462 schools)	
Men	9%
Women	8%
Anglo-American	9%
African-American*	6%
Asian & Pacific Islander	8%
Latino, Hispanic	9%
Demographic Category (Teagle Sample, 9 schools)	
Men	19%
Women	19%
Anglo-American	19%
African-American*	12%
Asian & Pacific Islander*	22%
Latino, Hispanic	18%

* Significantly different from Anglo, White comparison group (p<.05)

From both focus group interviews and from our survey, we discovered that Asian students are more likely to double major in large part because the double major serves as a way to balance the demands of their parents and their own interests and passions. Many Asian students choose a science major as their first major and then add a social science or humanities major. In our survey, eleven percent of non-Asian students said that a very important or essential reason for double majoring was that “one major is for me and the other major is for my parents.” More than twice as many Asian students (or 23%) gave this response. This explains, to some extent, why Asian students are more likely to major in two different areas of study (e.g., music and math), rather than doubling down in the same area (e.g., math and physics).

Family of Origin. Family dynamics—parental education, parental occupation, family income, and even family composition (e.g., number of siblings, single-parent homes)—often affect students’ post-secondary aspirations and achievements. Do these background characteristics also explain differences between single and double majors?

Chart 1.1 Double Majoring and Family of Origin



We asked students to list each parent’s occupation. Using average salaries for each occupational category, by gender, listed in the 2010 Census, we calculated an average household income of \$81,423 for the students in our sample. While we found no statistically

significant differences between the average household incomes of single majors (\$80,465) and double majors (\$81,990), double majors are more likely to be found in the right tail of the distribution, meaning they are more likely to come from very wealthy families (two standard deviations above the mean). Another useful measure of a student’s socioeconomic status is *first generation status*, that is, neither parent has a baccalaureate degree or higher. Double majors are more likely than their single majoring peers to have at least one parent with a baccalaureate degree or higher (85% versus 72%).

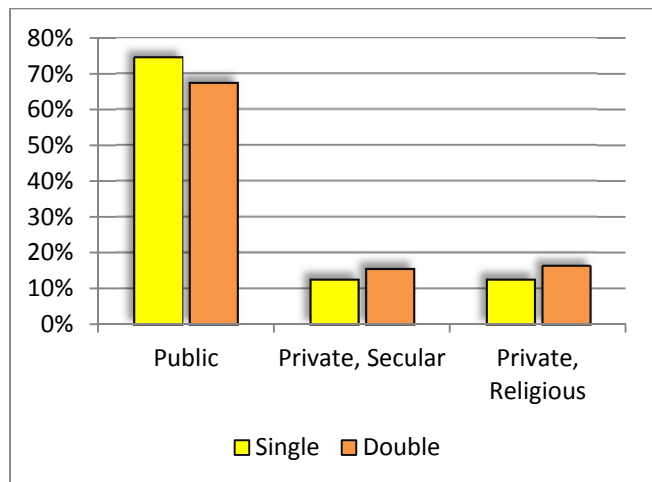
Sociologists use another variable, *cultural capital* (the extent to which students are exposed to the arts as children), as a proxy for a family’s socio-economic background. There are no significant differences between single and double majors in terms of either high or low holdings of cultural capital.

Secondary School Origins. Educational backgrounds, particularly secondary school contexts, also shape student decision making. We know from the time use surveys that high school students spend nearly fifty percent of each weekday in school or school-related activities. We asked students about some of their experiences in high school, specifically what kind of high school they attended, the degree of their involvement in school-related activities, and which AP and IB courses they took (and if they received credit toward college).

Double majors are three percent more likely to have graduated from private secular or religious high schools. Being involved and busy is nothing new to double majors. Students who eventually become double majors were very active in high school; nearly 87% of them spent more than five hours a week on school-sponsored extracurricular activities, with 41% spending more than fifteen hours a week; these

numbers are slightly higher than for single majors.

Chart 1.2 Students' High School Origins



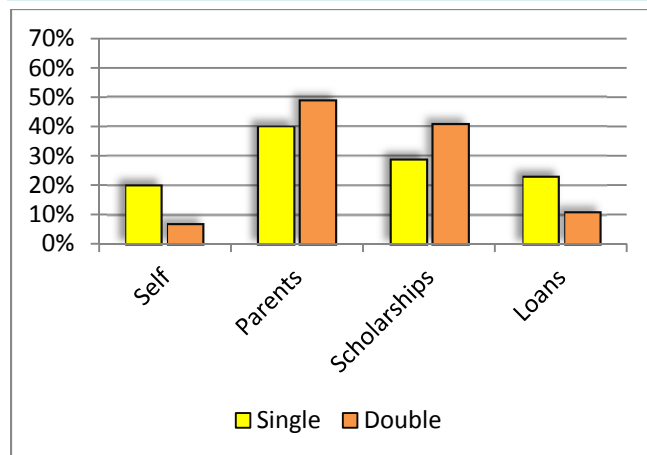
Finally, double majors also take more AP classes and enter college with more AP credit than their single majoring peers. Double Majors tend to have three more AP credits. In fact, students with more than twelve AP credits are 83% more likely to double major than those who have eleven or fewer credits.

More students double major across the country in part because there are growing opportunities for them to accumulate college credit while in high school. As Hannah (Business and Chinese) describes, “I came in a semester ahead of everyone. I’ve never taken more than fifteen hours a semester, so it hasn’t really been a stretch for me to double major.” In fact, many double majors describe having enough credits to graduate early were they to stick with one major; they chose two in order to stay for four years. Becca (History and French) who came in with 32 hours of AP credit and sophomore standing had the freedom to double major just to “fill in the time.”

In some ways, double majors—having taken a number of accelerated/rigorous high school courses—are not only extremely well-prepared for college in general, but have gained many of the skills necessary to overcome the expected

time management and other resource challenges caused by adding a second major. We will discuss this theme in greater detail in Section 2. As a result, their coursework doesn’t seem to suffer from adding additional, often seemingly incongruent, courses. Double majors generally have higher GPA’s than single majors. Students with GPAs that are 3.5 or higher are 2.1 times more likely to be double majors than those with lower GPAs. Understandably, single majors are more likely to have minors; nearly 55% of them do. Remarkably, in spite of the amount of work required to complete two majors, 27% of double majors also have minors.

Chart 1.3 Percentage of Students Reporting Financial Support (50% or More) from Each Source



Financial strain, often caused by accumulating student debt, is another variable that impacts a student’s ability to double major. Students were asked how they meet their college expenses. Double majors were more likely than single majors to say that one-half or more of their expenses were supported by either their parents (49%) or scholarships and grants (41%), compared to 40% and 29% respectively for single majors. Compared to single majors, double majors were less likely to say they supported themselves with work or savings (7%) or with student loans (11%). Double majors are also less likely to work during their time as undergraduates, a factor that likely

contributes to their having more freedom to pursue two majors.

While direct family background characteristics (wealth and cultural capital) have modest effects on double majoring in our sample of schools, first generation students as well as those who have to take out loans or work to put themselves through college are significantly less likely to double major. Moreover, the availability of AP courses and credits in high school is a big boon for double majoring.

WHAT DO DOUBLE MAJORS WANT? GOALS AND ASPIRATIONS

Double majors and single majors look remarkably similar in terms of what motivated them to select their college of choice. The academic reputation of their school was the most important reason for choosing their college; 71% of double majors and 64% of single majors said this was an essential reason for choosing their current college. The second most essential reason was the school was a good fit with the student’s personality, with around 52% of both single and double majors choosing this option. About a quarter of both double and single majors said they chose their school for its social life, job placement, or extracurricular opportunities.

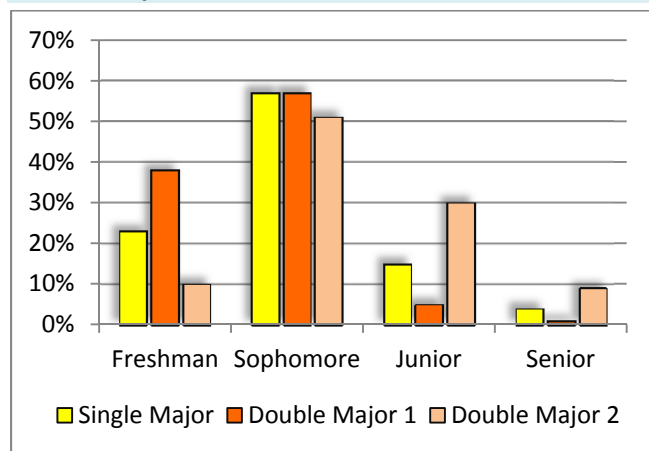
In terms of what they plan to do after college, both double and single majors are most interested in a career that gives them a) a “stable and secure future” (36% say this is essential) and b) that offers a “healthy balance between work and leisure” (27%). Single majors are slightly more likely to seek careers that allow them to be creative (24% vs. 21%). On the other hand, double majors are more likely than single majors to want to work for social or community change; 18% vs. 14% say this is essential.

In terms of educational aspirations, double major students are twice as likely to say they plan to pursue a Ph.D. eventually—eighteen percent versus nine percent. Thinking about graduate education overall, students who plan to go to graduate school are 72% more likely to double major than those who do not have plans for post-baccalaureate degrees. It is possible that the double major combination produces enhanced intellectual curiosity and academic engagement that translates into a desire to pursue further education. More likely, based on findings reported in Section 2, double major students see their combination of majors as a strategy to make them more competitive for graduate school.

TIMING: WHEN DO DOUBLE MAJORS DECLARE?

In most institutions, students are expected to have formally declared their first major by the end of their fourth semester. Double majors declare their first major about a semester earlier than single majors declare their only major. They declare their second major a bit later, usually during the summer following their sophomore year.

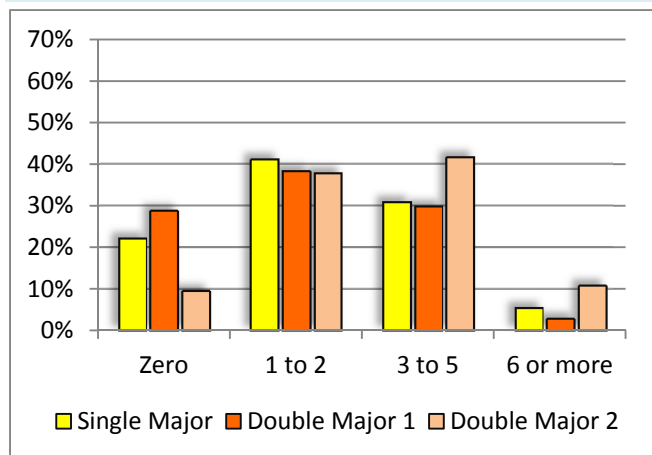
Chart 1.4 Year Students Declare Their Only, First, and Second Majors



Surprisingly, many students declare a major without taking even one college-level course in the discipline. As Chart 1.5 shows, 22% of

single majors choose their major without taking courses in the major. Nearly thirty percent of first majors in a double major combination are chosen that way. Students are most likely to declare first majors in business, the arts, the languages, and education without having taken any college-level courses in those majors. Because second majors are often declared so late, only ten percent of second majors are chosen without the student having had some experience with the discipline. In fact, double majors have much more experience with their second major before declaring it than their first.

Chart 1.5 Number of Courses Taken in a Major Before Declaring It



WHAT HINDERS STUDENTS FROM DOUBLE MAJORING?

Three-fifths of students who graduate with only one major considered double majoring. The top three reasons (although they could select more) they didn't were as follows:

- **33%** said they could not accumulate enough credits by the end of their fourth year
- **31%** said it was difficult to schedule courses for two majors
- **11%** said that studying abroad made double majoring difficult.

Other reasons students did not double major include that it would have made doing an honors thesis difficult (5%), double majoring

would have been difficult to do alongside independent studies and research (5%), and they were not curious enough about a second major to make it worthwhile (3%). About sixty percent of those who considered a double major and decided against it, often because they could not accumulate enough credits, ended up pursuing a minor instead. Future analysis should explore the different benefits and drawbacks of the double major versus the minor. To what extent can a minor offer students important breadth without the limitations and extra pressures of a full-blown second major?

As Table 1.2 shows, double majors do take more courses—about four more—than their single major peers by the end of their senior year.

Table 1.2 Average Count of Courses Taken in Seven Semesters

Semester	All	Single	Double
Fall 01	5.1	4.9	5.2
Spring 01	5.6	5.5	5.7
Fall 02	5.1	4.8	5.2
Spring 02	6.0	5.8	6.1
Fall 03	5.0	4.8	5.1
Spring 03	5.7	5.6	5.9
Fall 04	3.5	3.3	3.7
Total Courses	39.0	37.0	41.0

While some single majors decided against the double major option because they thought it would handicap their ability to study abroad (or vice versa), double majors are actually more likely to study abroad than their single majoring peers. In our data, 29% of double majors studied abroad while only nineteen percent of single majors did. To some degree, this is related to the additional costs associated with studying abroad, costs that can be more easily assumed by the wealthier students who are most likely to graduate with two majors. Additionally, there is a natural fit between

studying abroad and double majoring in a foreign language (a popular double major choice). We will explore this in Section 3 when we discuss foreign language majors in more detail.

WHAT ARE THE MOST COMMON DOUBLE MAJOR COMBINATIONS?

For double majors, the ten most popular majors are: 1) Foreign Languages, 2) Economics, 3) Business, 4) Engineering, 5) Political Science, 6) Biology, 7) Psychology, 8) English, 9) History, and 10) Mathematics. While many students incorporate foreign languages in their double major combinations, these are rarely a student's first major choice. In fact, other than Spanish and French, no other language major was chosen as a student's first choice when selecting the two areas of study. And only 26% of foreign language majors overall selected their language concentration as their first major. Moreover, not only is foreign language less likely to be the first major chosen in a pair, it is rarely ever chosen alone. Only 1.7% of single majors choose a foreign language as their major while 10.5% of double majors choose a foreign language.

The top ten double major combinations—accounting for about 21% of double majors—are as follows:

1. Two Different Business Majors
2. International Studies & Foreign Language
3. Political Science & Foreign Language
4. Economics & Mathematics
5. Economics & Political Science
6. Biology & Foreign Language
7. Economics & Foreign Language
8. Business & Foreign Language
9. Economics & Engineering
10. Psychology & Foreign Language

It is important to note that while individual humanities subjects do not show up in the top

ten list, humanities overall represent the second largest portion of all double majors (at 15% of all double majors compared to 31% for the social sciences). Because the humanities are diverse and tend to be matched with a large variety of different subjects (there are few typical combinations, like economics and mathematics), they do not show up on the list above. Nonetheless, overall the humanities are popular among double majors and, as an area of study, the humanities are chosen more often by double majors (15%) than by single majors (13%) (see Table 1.3).

Table 1.3 Percentage of Single Major and Double Major Students Selecting Each Major Cluster

Major Cluster	Single Majors	Double Majors
Agriculture	10 (2%)	8 (0%)
Ethnic/Area Studies	33 (5%)	132 (6%)
Arts	69 (11%)	122 (6%)
Biological Science	53 (8%)	132 (6%)
Business	42 (6%)	141 (7%)
Communications	19 (3%)	28 (1%)
Education	14 (2%)	60 (3%)
Engineering	77 (12%)	104 (5%)
Health Related	9 (1%)	11 (1%)
Humanities	85 (13%)	333 (15%)
Foreign Languages	11 (2%)	228 (11%)
Physical Sciences	43 (7%)	188 (9%)
Social Sciences	187 (29%)	681 (31%)
TOTAL	652 (100%)	2168 (100%)*

*This column represents the percentage of all majors chosen; 1,084 double major students chose 2168 total majors.

Gender Differences. There are clear gender differences between men and women in what majors they combine. These trends tend to follow the patterns observed in higher education research on single majors. Traditionally, men concentrate in business (including economics), engineering, mathematics, and science, while women have been highly concentrated in the arts, education, and humanities (including foreign languages). While recent decades have seen some convergence between the majors chosen by men and women, these traditional patterns

arise again when we observe the choices students make as double majors.

Economics—likely serving as a business major at institutions without business schools—is an important component of men’s double major choices. The top ten combinations for men—representing about ten percent of male double majors—are:

1. Business & Business
2. Economics & Engineering
3. Economics & Political Science
4. Economics & Foreign Language
5. Economics & Mathematics
6. Engineering & Mathematics
7. Economics and Business
8. Political Science & Philosophy
9. Engineering & Computer Science
10. International Studies & Foreign Language

On the other hand, foreign languages, and to a lesser extent psychology, are important components of women’s double major choices. The top ten combinations for women – representing 22% of female double majors – are:

1. International Studies & Foreign Language
2. Political Science & Foreign Language
3. Psychology & Foreign Language
4. Human Development & Foreign Language
5. Biology & Foreign Language
6. Business & Foreign Language
7. Business & Business
8. Art & Psychology
9. English & Foreign Language
10. Biology & Psychology

Racial and Ethnic Differences. To a lesser degree, ethnicity has also been shown to be related to students’ choice of major. There is virtually no overlap among the four races (cited previously) in terms of the ten most likely major combinations for each. The only major combinations that are common to most of them are foreign language-biology and business-business. Four majors—biology, foreign language, international studies, and

political science—are common to each ethnicity’s set of double majors. Business, economics, engineering, and psychology are common to three sets of the four.

White students are most likely to major in the following combinations (about 22% of White double majors):

1. Business & Business
2. Political Science & Foreign Language
3. Economics & Foreign Language
4. International Studies & Foreign Language
5. Business & Foreign Language
6. Biology & Foreign Language
7. Human Development & Foreign Language
8. Economics & Political Science
9. Engineering & Mathematics
10. History & Political Science

Just as Black students are less likely to double major than their peers, their choices of double major combinations are significantly different from other ethnic groups. Black students’ choices are more likely to include education, English, and explicitly inter-disciplinary majors, such as ethnic studies, international studies, and medicine, health, and society (MHS). These students are most likely to major in the following combinations (about 38% of Black double majors).

1. Psychology & Sociology
2. English & Ethnic Studies
3. International Studies & Foreign Language
4. Biology & Foreign Language
5. Psychology & Foreign Language
6. Communications & Political Science
7. Education & Education
8. Education & Foreign Language
9. Child Development & MHS
10. Psychology & MHS

Latinos are the only of the four ethnicities to include religion among their top combinations. Latino students are most likely to major in the following combinations (about 39% of Latino double majors):

1. Psychology & Foreign Language
2. Biology & Foreign Language
3. International Studies & Foreign Language
4. Business & Business
5. Economics & Engineering
6. History & Political Science
7. Human Development & Foreign Language
8. Political Science & Foreign Language
9. Sociology & Foreign Language
10. Sociology & Religion

Asian students are much more likely to major in engineering, economics, and math. Their top ten combinations include (about 34% of Asian double majors):

1. Economics & Mathematics
2. Engineering & Engineering
3. Economics & Political Science
4. International Studies & Foreign Language
5. Business & Political Science
6. Business & Business
7. Economics & Engineering
8. Biology & Psychology
9. Economics & Psychology
10. Economics & Biology

WHAT KIND OF SCHOOLS FACILITATE DOUBLE MAJORING AS A TREND?

Institutional Type. Based on data from our 1,462 school national sample, baccalaureate-only institutions are positively correlated with double majoring (see Table 1.4). This effect is net of other characteristics related to double majoring, such as high numbers of traditional-aged students or high costs. Public institutions report significantly higher levels of double majoring than their private peers, but only when controlling for tuition; public schools have nearly twice as many double majors as private schools. One reason public schools might have more double majors is because, on average, they offer a greater variety of subjects, including foreign languages. This variety provides potential double major students with more choice and more combinations. On the other hand, larger schools have fewer double

majors than smaller ones; for every additional 1,500 students, schools see a decrease of 1.25% in the proportion of their students who are double majors. So, the most common institutional type for double majors is a relatively smaller public school like Miami University, Georgia Tech, or the University of California, Davis.

Demographic Composition. The double major phenomenon is associated with the demographics of a school's student population. Campuses with large numbers of traditional-aged (18-24 year old) students and colleges with a greater proportion of white students have more double majors than their peers. On the other hand, campuses with more students receiving student loans (a proxy for low-SES) have fewer double majors.

Inter-institutional Prestige and Status. Highly selective colleges, which include schools where 25% of incoming freshman score 1,200 or higher on the SAT test, have more double majors than less selective schools. Of the three measures of institutional stratification, cost is the best predictor of double majoring; for every \$6800 in tuition, double majoring increases by a percentage point. In addition, schools with high four-year graduation rates have higher numbers of double majors than their peers. This is somewhat surprising given the common expectation that a double major would require more time to complete. This provides further support for the idea that double majors often arrive on campus with AP credits and therefore are typically able to complete their double degrees within the allotted 4 years. If we look at the most prestigious four-year baccalaureate colleges with highly selective students who pay tuitions higher than \$35,000 and graduate in four years at rates higher than 85%, we find double major rates at or above 20%. In fact, as mentioned earlier, some schools like these (e.g., Amherst College, Wellesley College) are graduating more than a third of their students with more than one major.

In summary, when we consider who double majors we find some important differences across socio-demographic categories and institutional types. We find that first generation students as well as those who have to take out loans or work to put themselves through college are significantly less likely to double major. Moreover, the availability of AP courses and credits in high school is a big boon for double majoring. To the extent that there are vast differences across high schools in terms of AP offerings, we see the effects of institutionalized inequality; even after being admitted to the same colleges, some students have less curricular choice than others due to differences in high school offerings.

Double major students appear to be more competitive and more ambitious than single majors; they have higher GPAs, accumulate more college credits, and are more likely to plan to go to graduate school.

Overall, business, economics, and foreign languages are the most popular subjects among double majors. Humanities and foreign languages, however, are more popular among double majors than single majors. And, there

are differences by gender and by race/ethnicity that mirror differences that scholars have previously observed when examining single major choices. Men focus more on business and economics; women on humanities, foreign languages and psychology. Asian students also concentrate on engineering, math and economics. Blacks are more likely to include education, social sciences (especially psychology and sociology) and communications. Latino students tend to pick social sciences as well as religion. Highly selective colleges and universities have more double majors than less selective schools, as well as schools (typically larger) that offer a breadth of subject areas.

Choosing to double major requires resources (e.g., time) and access (e.g., AP courses in high school). To pursue two majors successfully, students must also have experience juggling many demands and expectations. Thus, double majoring is not immune to the same inequalities that exist in other areas of students' academic and extra-curricular lives. Students from privileged backgrounds attending highly selective, well-resourced schools will find more opportunities to pursue two majors successfully.

Table 1.4 Predicted Values for Percentage of Double Majors at Different Kinds Of Institutions

Institutional Characteristic	Low Range	Medium Range	High Range
Number of Majors	25 majors (9%)	50 majors (11%)	100 majors (16%)
Number of Undergrads	10k students (8%)	25k students (5%)	45k students (3%)
Percent traditional age	25% (7%)	50% (8%)	100% (10%)
SAT Percentages	Few high (8%)	Avg high (10%)	Many high (12%)
Tuition and Fees	Cost \$8k/yr (7%)	Cost \$16k/yr (9%)	Cost \$40k/yr (13%)
Four-Year Graduation Rates	Low (9%)	Medium (10%)	High (12%)
Institutional Type			
Baccalaureate Only	Non-BA Only (8%)		BA Only (11%)
Private/Public Sector	Public School (12%)		Private School (7%)

Section 2

Influences on Double Majoring

We have explored where double majoring is most prevalent, who is most likely to double major, and the specific types of double major combinations that are most common. Now we turn our attention to the influences on double majoring, including the reasons students say they double major. In particular, we examine three factors – a) instrumentalism (the extent to which students double major in order to advance their careers); b) status and prestige (the extent to which choice of major is associated with estimations of esteem); and c) expressive individualism (the extent to which the major represents a student’s identity and sense of self).

Table 2.1 Percentage of Students Reporting High Levels of Importance of Different Factors for Their Choice to Double Major.

Reason *	%
It is preparation for work	76
It expresses my identity	72
To study subjects that are complementary	70
To be more competitive on market	68
To gain a breadth of knowledge	63
It is a better value	54
To take advantage of accumulated credits	47
One major is practical and one is fun	36
One major for me and one for my parents	13

* Students can select more than one choice.

WHY DO STUDENTS DOUBLE MAJOR?

When we ask students what factors led to their decision to double major, we find that they have a mix of motivations. The most important motivation, chosen as “very important” or “essential” by 75.8% of students, was to get preparation for work. The second most important motivation (72.3%) was “having two majors that together reflect who I am,” what we are calling “identity” or “expressive” reasons (see Table 2.1). But more than sixty percent of students also say that they are interested in getting exposure to complimentary and reinforcing skills and knowledge, being more competitive for jobs or graduate school, and getting a breadth of knowledge across different subjects. Far fewer students were motivated to double major in order to balance what they find fun and interesting with what their parents want or what is practical.

We began our research expecting more students to fall into either utilitarian motivations (i.e., double majoring is about getting a job, gaining skills, becoming more competitive) or expressive motivations (i.e. double majoring is more about identity, gaining diverse experiences, exposure). It turns out that fifty percent of all double majors say BOTH utilitarian and expressive motivations are very important or essential, and 50% and 46% say BOTH breadth (exposure to different areas) and depth (exposure to complimentary and reinforcing areas) are very important or essential. In other words, students have a mix of motivations and see their double major as fulfilling BOTH utilitarian and expressive purposes.

Table 2.2 Motivation for Choosing Single Major vs. Second Major*

	Single Majors		Double Majors (2nd major)	
	Any Reason	Top Reason	Any Reason	Top Reason
I have interest in subject	92.7	39.0	87.0	35.0
To get a job I want	65.0	10.5	56.0	09.8
It reflect who I am	65.0	17.3	51.0	11.0
I can contribute to the world	55.0	06.1	43.0	05.5
Previous life experiences	52.0	05.1	44.0	05.6
I like the professors	41.0	01.0	37.0	01.0
To get desired grades	37.6	02.4	44.0	03.0
It is prestigious	34.4	02.6	25.0	02.2
Requirements are flexible	31.0	02.3	34.0	01.0
I had previous credits	21.0	02.0	40.0	06.3
To make more money	20.3	02.9	14.0	02.0
Friends' influence	15.0	00.0	11.0	00.2
Parental influence	06.0	00.0	07.0	01.0

*Shaded rows indicate motivations that are more important for choosing a second major than for choosing a single major

Another way to understand the motivation of double majors is to look at the different reasons single major students give for choosing their major versus the choices double majors give for choosing their second major. Are second majors chosen for different reasons?

Table 2.2 reveals that the ranking of motivations—with “interest in subject” and “to get a job,” and “the major represents who I really am (identity)” as the top motivations—is nearly identical for both single majors and second majors. Ninety-two percent of single majors selected “interest in the subject” as one of the reasons they chose their major, compared to 87% of double majors choosing “interest” as a reason for their second major; 39% and 35% respectively chose “interest” as their top motivation. In general, students choose their second major for the same reasons they choose their first major: they are looking for an area of study they find interesting, that will get them a job, and that represents their self-identity. More detailed analysis reveals the same pattern; there is no evidence, on average, that students “hedge

their bets”—choosing a second major for expressive purposes (to follow their hearts, passions and identity) to counterbalance choosing their first major for utilitarian purposes (get a job), or vice versa. The only significant difference between choosing a single major and choosing a second major involves “convenience” (shaded rows in Table 2.2). When choosing a second major, students are more likely to be motivated to choose a subject where they already have a lot of credits, where coursework is flexible, and where they can get the grades they want. Lynn, an anthropology major, said she picked up her art history second major primarily because it is “a hobby, an interest, and I just happen to have enough credits.”

One big conclusion from this report is that there are distinct differences—small but important—between different types of double majors. This is true for motivation as well. In particular, students are more likely to select a humanities second major because it represents their self-identity and because of previous life experiences; they are less likely to say this

when choosing science or social science degrees. Students who are motivated by gaining a breadth of knowledge across very different fields are more likely to have a physical science and humanities combination.

DOUBLE MAJORING AS A FOUNDATION FOR POST-BACCALAUREATE OUTCOMES

As noted above, the greatest number of students chose preparation for work as an important or essential reason for double majoring. In focus groups, many students would explain choosing one or the other major because their future job would require a particular skill set (e.g., a job in sales requiring a marketing background); several went a step further and explicitly mentioned that they were seeking a double major in order to give themselves a strategic advantage after college. These students talked of the edge they believe double majoring would give them.

For example, Tim (Economics and Geography) didn't see a specific value in coupling economics—his primary interest—with geography; but, he argues that being a double major makes him stand out in an application pool. He says that double majoring “gives me a leg up over the other people who are also pursuing those types of opportunities. I've actually looked at resumes at a place that I worked last winter and there were a ton of just single-econ majors. I think the company I was working for was far more interested in someone who was not the generic econ major, but had a little bit more substance.”

Other students chose a double major because the major they felt they would need for employment in a particular field wasn't available on their campus. They felt they had to cobble together two majors that, together, might indicate to a future employer that they had the necessary skill set. Angela (psychology and visual arts) “was always really interested in

advertising, but [her school] doesn't have an advertising major at all. So I thought that psychology and visual arts was a good way to get into the field.” Angela's case is interesting because she eventually picked up a marketing minor because she felt her chosen majors did not adequately prepare her for the jobs she was seeking. She says, “I started taking classes more about business and I just started feeling kind of like an idiot. I had been taking these art classes when I really kind of wish I had been taking Econ classes and learning more about financial systems and organizations. I like the majors I chose and I'm interested in them. I just wish I'd been an economics major or something up that alley, because now I'm completely left out.”

Billy (Psychology and Biology) describes his suspicions this way: “I'm planning on going into medicine. They recognize the biology aspect, but I think that the psychology aspect really adds another dimension to it because I have some experience interacting with how people think and how people interact on a personal level due to this additional psych major. I think it'll really help me in the application process.”

While we have no first-hand knowledge of how employers (or graduate admissions officers) perceive double majoring, those students who had been on interviews described one important benefit of having two majors: it gave them and interviewers something to talk about.

Those interactions can be both good and bad. Bradley (Engineering and Spanish) says, “when I go on interviews for an engineering internship or something, they ask ‘what do I gain from Spanish . . . how is it complementing my engineering’ and generally my answer is somewhere along the lines of ‘just communication’ because a lot of engineers hate writing papers, hate anything humanities related. I say it helps me to be able to communicate ideas better, more clearly than most other engineers, and it helps me to be

able to put, like technical things, in ways that other people can understand.”

Alternately, Lauren (Psychology and Neuroscience), who was applying for neuroscience graduate programs, had interviewers question if she would be able to handle the science of the neuroscience program *because of her psychology major*: “Some interviewers said ‘we’ve had psych majors that tend to struggle with some of the data aspects.’ It never crossed my mind that having two majors would be a risk.”

Even if employers and graduate schools are particularly interested in double majors, students report that these institutions do not make indicating that status very easy. Beth (English and Philosophy) applied to graduate school and complained that “The people that I’ve spoken to at a couple of the grad schools I visited said that what they thought was particularly strong about me was the fact that I was a double major. That’s something that, at least in English, grad schools are really looking for right now. But I couldn’t actually talk about double majoring in my application, because a lot of times, the online application didn’t let you type that you had a double major in anywhere.” She ultimately decided to put that she was an English major on many of her applications, only mentioning her philosophy major in her statement of purpose.

STATUS AND PRESTIGE OF MAJORS

When higher education researchers write about stratification among occupations, they use only a few attributes to determine each occupation’s social value. Other than the most obvious of these, income, another commonly used attribute in statistical analyses is the *status* or *prestige* of the occupation. Researchers tend to use some iteration of Blau and Duncan’s Socioeconomic Index (1967), in which occupations are given a rating based to a large

degree on the income, autonomy, and education required for each occupation.

A few studies have sought to create a status index for college majors, primarily by mapping majors onto occupations and determining their likely income, by examining levels of popularity and institutional resources, or by inferring status based on the type of intellectual work required of the major (Braxton and Hargens 1996; Kerr 1991; Lodahl and Gordon 1972). Instead of using correlative data to determine what status majors may have in the minds of students, we went directly to the source, asking students to score thirteen disciplinary clusters as either having very low status, an average level of status, and very high status or prestige. Students were asked to rate these clusters in terms of their own perspective and then to rate them again in terms of how they thought society more generally would rank them. A more detailed analysis of this issue can be found in a separate report by the authors, but in general, students tend to rate the disciplinary clusters as we might predict.

Table 2.3 Aggregated Student Ratings of Disciplinary Clusters’ Status and Prestige

Major Cluster	Ratings	
	(Self)	(Society)
Agriculture	1.84	1.31
Area/Ethnic Studies	1.73	1.31
Arts	2.13	1.75
Biological Sciences	2.64	2.56
Business	2.35	2.83
Communications	1.89	2.06
Education	2.33	1.71
Engineering	2.72	2.74
Foreign Languages	2.01	1.64
Health-Related Discipline	2.31	2.19
Humanities	1.98	1.61
Physical Sciences	2.54	2.49
Social Sciences	2.10	1.97

As we show in Table 2.3, students consider engineering and the natural sciences (biological and physical) to be the most prestigious majors

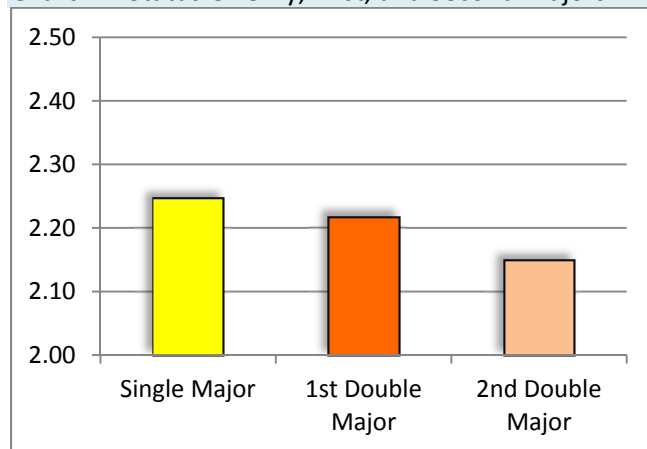
on campus (as scored on a scale of 1 to 3, with 3 as very prestigious and 1 as not very prestigious), whether rating them in terms of their own attitudes or those they ascribe to the society at large. The small differences of only .01 to .05 between the aggregated “self” scores and the aggregated guesses about society’s scores are revealing. There is very little difference between students’ sense of how society views these two majors and society’s actual views—as represented by the aggregation of student opinion—of them.

There is much more variation in the next highest scoring disciplines: business and education. Student beliefs about how society views business is half a point higher (2.83), on a three point scale, than (student) society’s actual evaluation (2.35). Conversely, student beliefs about how society views education is significantly lower (1.71) than student’s actual evaluation (2.33) of it. While education has the greatest gap, students perceive several other majors as significantly “under-valued” by society, including the arts, humanities, and foreign languages. While more research is needed, we suspect that students tend to pair under-valued majors with a second major in order to boost the status of their degree.

We find some evidence of this when comparing single and double majors. About 34% of our respondents say that they chose their first (or only) major because it is generally considered a prestigious major. That drops to 25% for the second major for double majors. While students claim not to choose majors for their prestige, it seems to be the case that the status of a major (particularly if located in a double major combination) does matter. As Chart 2.1 shows, students who only have one major tend to have fairly high status ones (2.25). The first major for those who double major is substantially lower in status than the only major of single majors; at 2.22 it is practically at the mean (2.21) for disciplinary prestige. The second double major choice is quite low in

status (2.15), scoring lower than single majors’ only major. Apparently, if a major is high status, students are less likely to see a need to add a second major; the first one is enough. If the second major is “needed,” it is interesting that students aren’t counting on that major to add status or prestige to their portfolio; clearly, in the average case, it isn’t likely to do that.

Chart 2.1 Status Of Only, First, and Second Majors



Another way to look at the relationship between college major and status is to discover how double majors think about themselves when either talking to others (friend, parents, future employers) about their majors or when thinking about their core identities and future plans. We asked double majors to consider how much or little they focus on their first and/or second majors (as specific majors) in each of those settings.

In Table 2.4, we’ve listed nine possible double major combinations, three with biological sciences (high status) as the first major, three with arts & architecture (medium status) as the first major, and three with foreign languages (low status) as the first major. We then show the degree to which students focus on those first majors when they are coupled with the three second majors listed under them. The second majors were picked based on their status relative to the first major; average status ratings are listed in parentheses. The numbers in each column represent “proximity” to the first major, such that a low number (well under

5) represents a greater focus on the first major and a higher number (well over 5) represents a greater focus on the second. A number close to 5 represents an equal focus on both majors. The scale itself goes from 1 to 10.

We discovered that overall (first row in the table) students are slightly more likely to focus on their first major than their second in every context (scores below 5). The differences become more stark when we look at different major combinations. Students with biological science first majors are more likely to describe themselves to parents and employers (columns 1 and 2) as “biology majors” than as business, social science, or humanities majors. This is to be expected as biological sciences is a very high status major. What is particularly surprising is that when they think about who they are at their core, in terms of identity, they are more likely to focus on their lower status majors. In fact, biology-humanities majors tend to identify more with their humanities major than with the biological one. We see a similar pattern with arts-science and business-language majors; students focus on high status majors when talking to parents and employers, but low status majors when thinking about who they are at their core. The findings are more mixed when combining moderate-to-low status majors with similarly situated ones, but there is a fairly stable pattern showing that the first major is the “outer directed” major (focused on with parents and employers) and the second major is the more “inner directed” one (focused on when thinking about one’s “true” self).

As you can see from some of the numbers in Table 2.4, students focus more on one or the other major when presenting their “story” to the world. One way that this focus is played out is in the way students order the majors when speaking about them to others. Some students order their majors based on chronology; they list them in the order they declared them regardless of their attitude towards them. But more often than not, their focus and ordering

are determined by the context in which they find themselves.

Table 2.4 Degree of Student Focus on First (and Second) Major in Different Contexts

Major Combination	Parents	Employer	Identity
<u>All First Majors</u>	4.4	4.3	4.5
<u>Biological Sciences (2.64)</u>			
<i>Business (2.4)</i>	3.2	3.6	3.8
<i>Social Sciences (2.1)</i>	4.8	4.3	5.4
<i>Humanities (2.0)</i>	4.2	4.1	5.6
<u>Arts/Architecture (2.13)</u>			
<i>Natural Sciences (2.6)</i>	5.9	6.4	4.9
<i>Social Sciences (2.1)</i>	6.3	5.5	3.5
<i>Humanities (2.0)</i>	3.4	3.9	2.7
<u>Foreign Language (2.01)</u>			
<i>Business (2.4)</i>	6.0	5.3	3.3
<i>Social Sciences (2.1)</i>	5.2	5.3	4.2
<i>Ethnic Studies (1.7)</i>	4.3	4.9	3.1

Audience Expectations. More than a couple of students were surprised at the order they listed their majors when introducing themselves at the beginning of each focus group. Even though they consider one major to be their primary one in terms of an academic identity, they find themselves listing or focusing on the major that has more status with the audience in question. Jane (Political Science and Economics) tends to lead with political science even though she does “consider economics my primary major. I think it sounds better to say political science first.” Sara’s (Psychology and Creative Writing) tendency to put psychology as her first—and sometimes, only—major is even more instrumental and based on her audience’s value: “I know this is terrible, but if I’m filling out something for a job interview, I tend to put psychology because I figure people are going to take that more seriously than creative writing a lot of the time. In my head I think creative writing first because that’s what is

most important for me, but psychology is kind of paying for the creative writing.”

As another example, Evelyn (Economics and Philosophy) described an interaction with a professor: “He asked me, ‘what’s your major,’ and I said, ‘economics and philosophy,’ and I think he completely just ignored the philosophy part because he went on to tell me how people like me must be super analytical and that I need to be more creative. I do have to be creative when I do philosophy papers, but when they see me, econ overshadows everything else that I am.”

While it is true that much of the ordering described here is a function of the students’ sense of what their “audiences” are interested in hearing, this perception is based in part on the students’ observation of what others seem to value. Students tell us that when their parents describe them and their majors at, say, family gatherings, the closer the two majors are (in terms of clustering), the more likely they are to mention the two together. If the majors are farther apart in status (e.g., English and chemistry), they’re more likely to drop the lower status one.

While our analysis focuses on the status of major by cluster, when students have double majors within the same cluster (e.g., social science), we can still detect differences in the perceived value of majors. Kal (Psychology and Sociology) says “if my friends and I are having a healthy debate, I’d say something and they’re like ‘is that reverse psychology’ or ‘are you psycho-analyzing us or something.’ They always focus on the psychology. I think some of that is because I tend to call it first, but it’s also because they see more application of psychology than sociology.”

DOUBLE MAJORS AS EXPRESSIONS OF IDENTITY

When asked why they chose to double major, the second most popular reason, behind only “better preparation for work,” was because the two majors together best represent who they “really are”. Nearly three-quarters chose this option. We consider this to be an “expressive” motivation: students are selecting their majors in large part as an expression of their identity. In our focus group interviews we found two variations on this theme: some students picked up a second major in large part because their first major did NOT fit the image they had of themselves; other students picked a second major because they saw the combination of the two together as uniquely suited to their self-image. Liz (Art History and Visual Communication) fits into the first category. She notes, “I want to emphasize design because I am prouder of that than art history. I started with art history, but this [design] is actually what I want to do and what I really want to tell you about myself.” Similarly, Caden (Education and Environmental Studies) noted that his education major forced him to spend 10-12 hours a day inside as a student teacher, but he sees himself as an outdoorsman and notes, “the environmental studies major is important to me; it lets me be outside all the time and I love it.”

Grant (Computer Science and Philosophy) discusses how he picked up a philosophy degree after being disenchanted with computer science. “I realized I didn’t want to do computer science anymore, but my parents were like ‘dude, you need a strong enough major to be able to leave [Jamaica] if you want.’” Grant was a philosophy minor but slowly realized that he was spending all his time in the philosophy department. “I wanted to write a philosophy paper and get it published. I wanted a philosophy adviser because that’s where my area of interest was.”

Katie (Geography and English) discusses how she added English to help complete her identity—to go back to something that had always been important to her. She remarks, “I feel like I have always been very one-sided verbally. That is where my strengths lie. In high school, writing was always a lot easier for me. When I came to college I was very determined to move away from that and pursue an entirely different track. I wanted to try something new. But then when I started taking classes, I realized I really missed talking about books, reading books. So, I have come around and realize that I don’t have to make a choice between two things. I can do both of them. These are two things that I really, really like.”

Or, consider Thomas (Visual Art and Linguistics) who describes himself as a real “liberal arts type, seeking knowledge and experience rather than preparation for a job. He chose art because “my family is a real artistic type of family. I’ve always been around painting and have always been really interested in animation and basically anything associated with the art world.” But in college, he further realized that he loved language and literature: “My mom taught me to read at an early age and I have always been grasping for more. I have friends who are into a lot of literature so I kind of got interested in language. I’ve always loved word games and realized that I could learn how language works.”

Finally, Caroline (Math and French) feels that her double major allows her to cross CP Snow’s (1960) “two cultures”: “I have always had a personal interest in both sides, like the science side and the humanities side. So for me, that’s what I was looking for. One major that would be the more “sciency,” logical side of me, and one that would be more like the conceptual, philosophical side.”

While most students were motivated to choose their two majors in part for practical, work-related reasons, evidence from our focus

groups and survey suggests that the choice of major is also very much part of students’ “identity projects.” They choose subjects with which they have a personal relationship, connecting their major to experiences recalled from high school or earlier. They repeatedly remark, “I’ve just always been interested in...” and discuss their major choice as natural or almost inevitable. While we did not do focus groups with single majors, based on the empirical data, we suspect that these personal motivations are similar for single majors. Double majors, however, often felt limited and unfulfilled by only one major. For these students, the double major comes to represent what they see as two sides of their personalities or identities.

Intersections between Academic and Other Personal Identities. The intersection of race, gender, and major helps to shape students’ descriptions of themselves. Veronica (Molecular Biology and Religion) considers the intersection of other identities with her choice of majors, and this drives how she describes herself: “I think being a female in the sciences is important. And in terms of ethnicity, I’m Hispanic, so it’s even more so because being Hispanic and in the sciences is not very common. So I think those things play a role in how I see myself and how I describe that to people.”

While Veronica’s descriptions focused on the pride she felt in being a Latina in the sciences, many of the Asian-American students who discussed their double major combinations expressed some resentment about their higher status majors. They often described having to pursue a particular high status major to meet a kind of cultural norm. Evelyn, an Asian-American Philosophy and Economics major, says, “I think there are not that many Asians who study philosophy. When I am back at home and I go to these family parties and whatever, relatives have asked me what I’m studying. And you know, sometimes I just feel

a little rebellious and I just say philosophy instead of economics and just kind of look at what the reaction will be. The reactions are usually, ‘Hmmm, that’s [pause] interesting.’ I know at the back of their mind they are thinking, ‘what kind of job is she ever going to find with that major.’”

Foreign Language Double Majors. Foreign language majors, whether declared first or second, tend to receive short shrift when students describe themselves.

Students with double majors in foreign languages and practically anything else typically under-represent their foreign language major in their academic identities. In fact, foreign languages were often less likely to be the focus when talking to parents or employers than other majors *regardless* of which major it was paired with. Though always mentioned, the language major is treated as a kind of supplement to the first major, rather than an essential component of the student’s academic identity.

Some examples of how students described themselves (or are described) are instructive here:

Xander (French and International relations): “I definitely associate myself more with the international relations aspect with the tagline of ‘I speak French’”.

Pablo (Spanish and Computer Science): “I really feel that Spanish is an auxiliary to computer science. First people hear computer science and they’re like “Whoa,” and I definitely get a lot more respect for that. I feel that Spanish has been like an auxiliary tool, something that just makes me a bonus. I’m a computer scientist who speaks Spanish.”

Natasha (German and Economics): “I would definitely say that I always say economics first because economics is real, applicable, more challenging, whereas I see German more as my fun language. I feel like I sell myself differently if I said German and then economics.”

Ozzy (Spanish and Creative Writing): “Normally my mom gets both of them in there. But if she does forget one, it’s always Spanish. She always says the creative writing because that’s what I proclaimed from a young age that I wanted to go into. So she’s kind of grown accustomed to that.”

Brad (Spanish and Mechanical Engineering): “I would say mechanical engineering first and then Spanish. If I’m telling mechanical engineering majors, they say ‘ugh’ to the Spanish. If I tell Spanish majors, they say ‘ugh’ to the mechanical engineering. But if it’s people outside, they say, ‘Okay, that’s great, but what are you going to do with the Spanish? Why is that there?’”

In the conclusion and recommendation section of the report we revisit the importance of integrating academic and personal identity. While some students had compelling stories about how their two majors intersected and fit together well, and reflected their goals and aspirations, many students lacked such forceful narratives or came up with a story only after considerable prodding and reflection during the focus group. We believe schools can and should do a better job of helping students construct persuasive accounts of the coherent fit between their two majors.

Section 3

Impact of Double Majoring on Key Outcomes

There are three types of impacts that we explore in this section. First, we examine the relationship between double majoring and participation in a range of extra-curricular activities. Does the time and energy required to pursue two majors limit the time students spend on other educational, cultural, and social experiences outside the classroom? Or does double majoring expand opportunities for engagement, leading to an even richer extra-curricular life? Second, do students report any enhanced “liberal arts” outcomes as the result of their double major? These liberal arts outcomes include enhancing curiosity, creative thinking, integrative learning across disciplines, study abroad, original research with faculty, and independent coursework (Berlyne 1954; Brint et al 2008; Kuh 2007; Pascarella and Terenzini 2005). Finally, is there any preliminary evidence that double majoring produces the kinds of post-baccalaureate outcomes—e.g., major-related employment, advanced degree attainment, and higher salaries—that students hope their choice to double major will lead to?

DO MORE, DO MORE

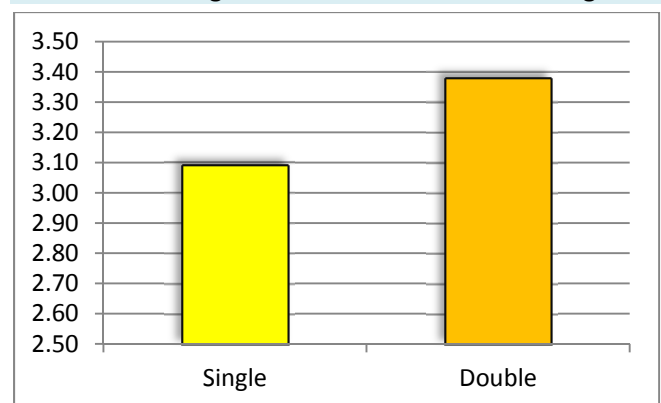
Graduating with two majors is no easy task. Typically, students must take more than sixty required credits across their two majors; they must navigate complicated course schedules, sacrifice opportunities to take “easier” or “fun” classes, and master two domains of knowledge. Scholars have reported increases in stress and anxiety among college students, and the popular press often depicts students as overscheduled, overcommitted, and working at a relentless pace—especially at the most competitive colleges and universities. Does the choice to double major reinforce or exacerbate

these conditions? Does it stretch students even thinner?

Initial evidence suggests double majors are up for the challenge of managing the workload without sacrificing other areas of their lives. These students reflect the “do more, do more” phenomenon. Interestingly, social scientists have found that all forms of social engagement feed off of one another; so instead of one form of engagement substituting for another (e.g., if I go fishing I won’t go to the theater), it turns out that doing any activity is likely to be associated with doing more of almost anything else. People who are active seem to be active in many domains and are able to keep many balls in the air at once. Double majors seem to do more of just about everything.

Compared to single majors, double majors are more active in extracurricular activities, more likely to be officers of clubs, more likely to participate in volunteer activities such as Alternative Spring Break, and more likely to attend lectures outside of class.

Chart 3.1 Average Number of Activities in College

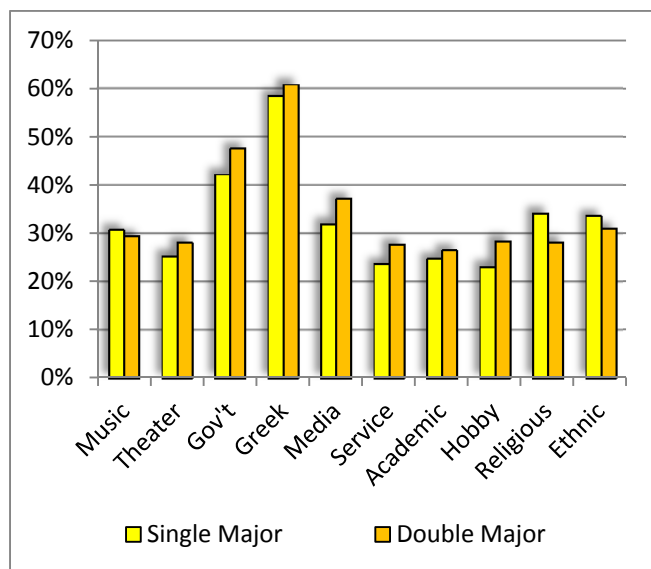


Of the thirteen types of activities we asked about (from playing in a school-sponsored

band to joining a service club), double majors, on average, participate at a rate 9% higher than single majors, or an average of 3.38 activities compared to 3.09 activities (see Chart 3.1).

And, importantly, double majors are not just padding their resumes by signing up for many different clubs without investing much time in any of them. It turns out that double majors are just as likely as single majors to be officers of clubs. Thirty-nine percent of double majors joined fraternities and sororities (compared to 36% of single majors). Of those 39%, more than one-half served as officers of the club. 36% of double majors joined academic clubs (compared to 31% of single majors); of those, more than a quarter served as officers.

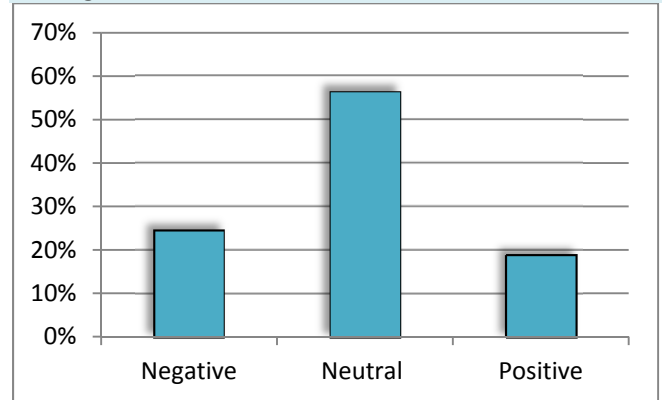
Chart 3.2 Percentage of Students Joining Clubs and Teams



Interestingly, even though double majors actually report more involvement in clubs and sports than single majors, when asked about the impact of double majoring on those college experiences, 25% felt that double majoring reduced their opportunities to participate in clubs or sports, while 19% felt that double majoring enhanced their opportunities (see Chart 3.3). We suspect that double major students not only “do more,” but also aspire to

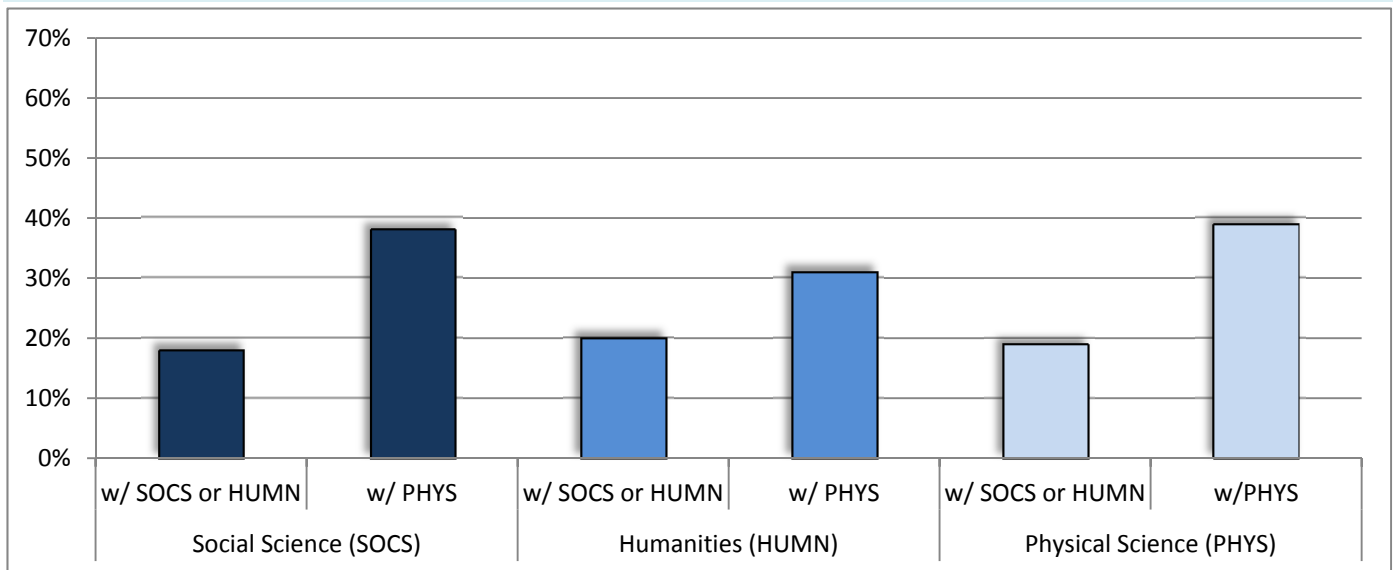
do even more than they do. So, they may fall short of their aspirations and blame their double major in part on what they perceive as missed opportunities.

Chart 3.3 Perceived Impact of Double Majoring on Joining Student Activities



Of course not all double majors are the same, and there is significant variation among double majors in the extent to which they perceive additional constraints on joining clubs and teams. In particular, students who double major in the physical sciences perceive greater limitations. Again, in reality they join activities at more or less the same rates as their other classmates. When a social science major picks up a humanities or another social science second major, eighteen percent report that their double major has a negative impact on their extracurricular lives. When a social science major picks up a physical science second major, 38% report negative effects, more than twice as many. When a humanities major adds another humanities major or a social science major, 21% report negative effects on their extracurricular lives; by comparison, when a humanities major picks up a physical science major, 31% report negative effects. Finally, if a physical science major picks up a second physical science degree, 39% report negative effects on extracurricular activities; if they pick up a social science or a humanities second major, only nineteen percent report negative effects.

Chart 3.4 Negative Impact of Particular Double Major Profiles on Joining Student Activities



A double major in chemistry and biology noted that he had to “scramble to take intensive science courses. I took three lab classes in a term and it destroyed me. I pulled like thirty all-nighters. I found it extremely limiting.” Another student noted that she used to play on the women’s ultimate Frisbee club, but had to give it up because she “was bombarded with at least two labs a week.... You don’t have time to go to practice and you can’t travel because you can’t make up these labs because they are four hours long and no one wants to proctor them...”. Throughout our focus groups, we heard science majors describing the challenges imposed by inflexible lab requirements that constrain them for extended periods to specific times and days of the week. The demands on a physical science double major produce constraints on participation in non-academic activities.

Participating on teams and in clubs requires a higher level of commitment and engagement than participating in extracurricular events, like lectures, concerts, debates, and rallies. To what extent is double majoring related to increased or decreased attendance at extra-curricular offerings?

Chart 3.5 Percentage of Students Participating in Campus Events and Activities

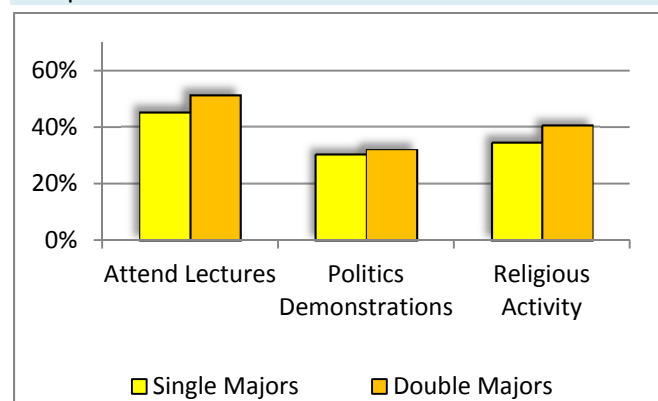
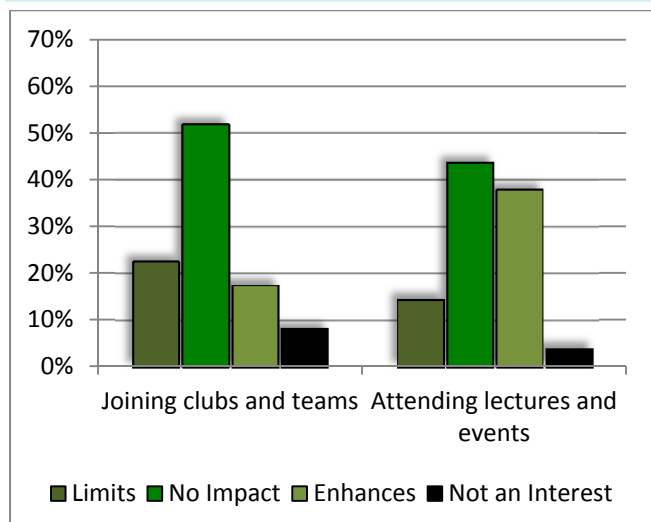


Chart 3.5 shows that double majors are more likely to attend events and activities (lectures, political demonstrations, religious events) than single majors. They are also more likely to participate in an Alternative Spring Break activity. We suspect that this reflects in part the “do more, do more” phenomenon described above. But, we also suspect that double majors can expand extra-curricular opportunities through the strength of weak ties. When students add another major, they expand their personal networks, often adding friends or acquaintances that represent different areas of campus life. Research has suggested that the strongest predictor of attending cultural—and likely other—extra-curricular events is whether someone asks you to attend (Brown 2012).

Knowing more classmates from more parts of campus should expand opportunities to learn about events and activities; it should also increase the probability that you will be asked to join in something that you might not otherwise have known about. In focus groups, students often described their two majors as two different social worlds. Katie remarks, “I have my English friends and we get together and talk about papers and stuff; then I have my geography friend and there is not a huge overlap between them.” Tim agrees: “I definitely have two different groups of friends in the two different departments.” And, Dan, a musician and engineer, remarks, “I have distinct friends... engineering friends and music friends and there is not a lot of overlap there.” Academic majors help structure friendship circles. Therefore, double majors are likely to have more diverse friendship circles leading to more diverse opportunities for learning about and participating in extra-curricular activities.

As we noted above, there are important differences between actual and perceived obstacles. While double majors participate in more clubs and teams than single majors, they still perceive their double major as having, on balance, a more negative than positive impact on joining clubs.

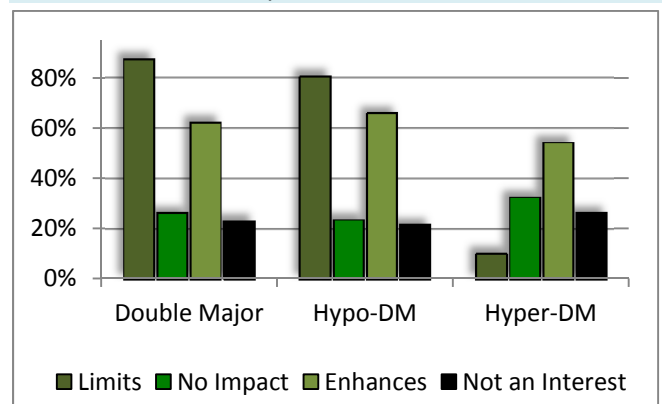
Chart 3.6 Perceived Impact of Double Majoring on Joining Clubs and Attending Lectures



In the case of the more informal activities, like attending events or lectures, double majors experience a modest increase in activity level, but they perceive even larger benefits. Thirty eight percent report that double majoring actually enhances their attendance at lectures and campus events, compared to only 15% who say that the double major limits their attendance (see Chart 3.6). This offers further evidence, perhaps, of the positive benefit of having a foot in two different worlds on a student’s exposure to diverse campus activities.

As further evidence that double majors get exposed to more-diverse classmates, 62% report that their double major combination “expands their opportunities to interact with people who are different from them.” And, importantly, this benefit is greater for those who chose majors in different disciplines (hypo-specialization)—66%—compared to those who chose majors in the same discipline (hyper-specialization)—54%. (see Chart 3.7).

Chart 3.7 Perceived Impact of Double Majoring on Interactions with People Different from Themselves



This perception that double majoring leads to more exposure to diverse people is reinforced in how students perceive their own strengths and weaknesses. When asked to rate themselves on a scale of 1 (lowest) to 7 (highest) on their ability to “see the world from other’s perspectives,” seventeen percent of students who were double majors rated themselves as a 7; whereas only thirteen percent of single majors gave themselves a 7.

We conclude that double majors not only perceive a “diversity” pay out from their choice, but they also rate themselves higher, perhaps because of their double major combination, in their ability to see the world from other perspectives.

Meeting The Challenge and Still Managing The Demands.

Like many college students, double majors have mastered the “art” of going to school—juggling many competing demands, mastering expectations, getting the grades they want, and still leaving room for a social life. Erika (Spanish and Education) explains that she has to take a senior research class for Spanish on top of four intensive methods classes for education: “It’s a lot to do and if I were just a Spanish major I would be relaxing. But, I am not so stressed. It is completely manageable if you have a planner.”

David (Music and Mathematics) acknowledges that he is “busy” with his double major but says there is nothing else he would rather be doing. In fact, he boasts, “I find myself being able to do a lot of different stuff anyway.”

Leigh (Math and Sociology) claims that getting a double major hasn’t put any extra constraints on her academic or personal interests. She takes the expected fifteen credits each semester and within each major still chooses a combination of “easy” and “hard” classes to help her manage the workload. In fact, she says that the double major has actually benefited her outside the classroom. “Because of my double major I have gotten a lot of positions in different activities. Well at least my math major because people expect that I can handle numbers.”

In the same focus group, Jane (Political Science and Engineering) asserts, “I sacrifice nothing. I have a very active social life. I play

club sports and I am the treasurer of the team probably because of my econ and finance major. And, I’m involved in giving back to the community through several programs. And, you know, I still party with my friends probably three nights a week and have been able to do that for about four years now.”

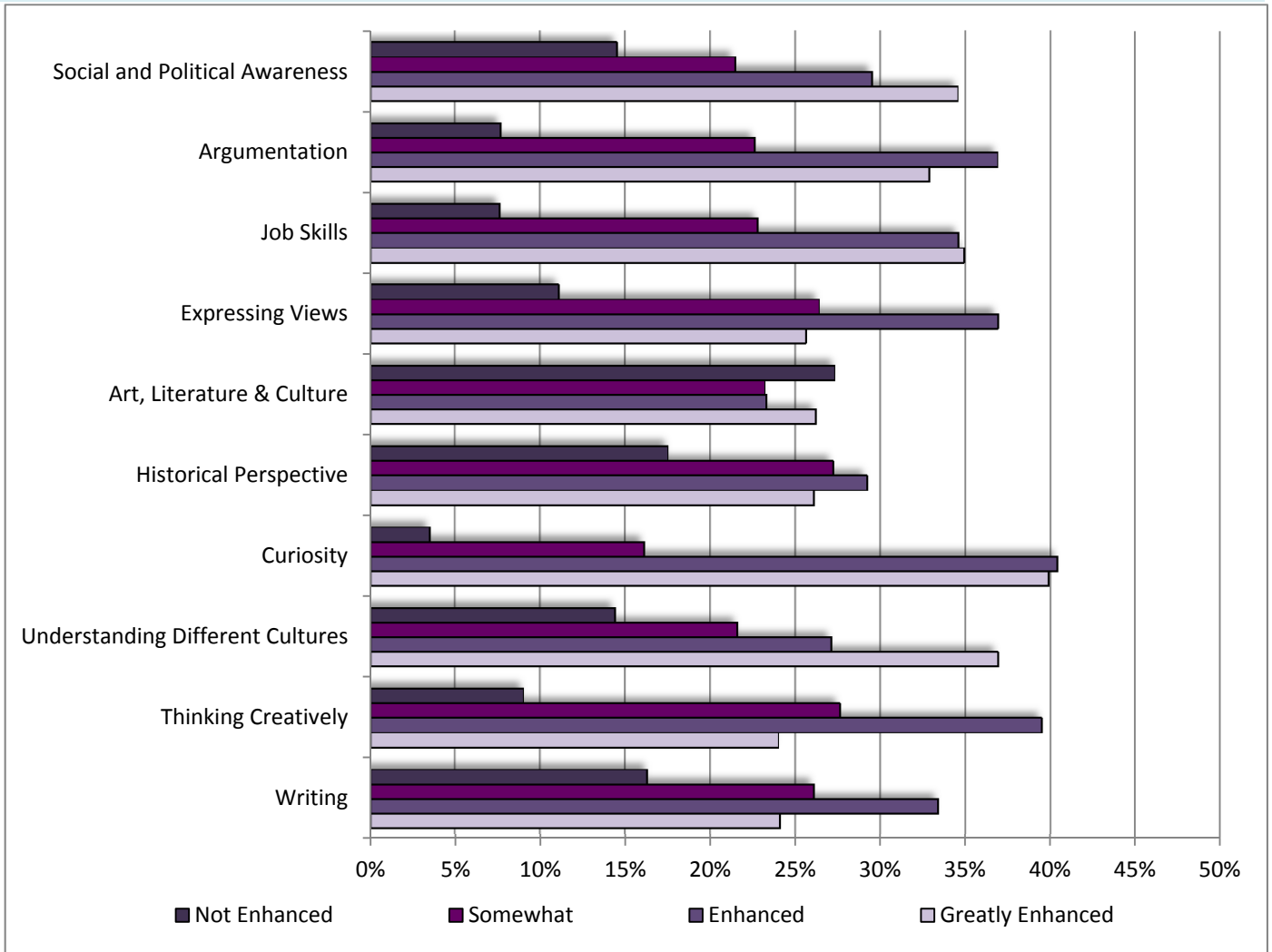
Increasingly, especially at elite colleges, students arrive on campus with extensive resumes that demonstrate their ability to master the challenges of the overscheduled and overcommitted student. David, quoted earlier, pointed out that he was “ridiculously busy” in high school, so he didn’t mind being very busy in college—he was “okay with taking 18-19 credit hours.... it was no big deal.” Given the complexities and time demands on double majors, these students seem to display an even greater fluency at juggling the challenges of college. They are confident, organized, focused and able to take on additional coursework with few consequences on their extra-curricular lives. In fact, several students in our focus groups noted that they could have probably taken on a third major without much difficulty.

RETURNS TO CREATIVITY

This study was motivated from the beginning by the hypotheses that pursuing two majors might have a creative payout. Perhaps students are more creative because their double major exposes them to potentially diverse perspectives, allows them to pursue topics they are passionate about, and encourages them to integrate across disciplines. Does the evidence bear this out?

We asked students whether or not their double major combination enhanced learning and skills in a number of areas (see Chart 3.8). On balance, across all skill and learning areas, students see their double major combination as an enhancement.

Chart 3.8 Impact of Double Majoring on Perceived Learning Outcomes



Specifically with regard to creativity, 64% report that their double major combination enhanced or greatly enhanced their ability to “think creatively,” while 80% felt their double major combo enhanced or greatly enhanced the development of intellectual curiosity.

Our initial theory suggested that double majoring should enhance creativity because it requires students to work with and across very different learning styles, approaches, and disciplinary perspectives. We call students who double major across different disciplinary boundaries hypo double majors, or “spanners.” Those students who “double down” or choose two majors from within the same disciplinary area are referred to as hyper double majors, or “deepeners.” Therefore, we would expect hypo double majors (spanners)

to perceive greater creativity gains from their combination than hyper double majors (deepeners). However, preliminary evidence does not support this claim. Hyper double majors were just as likely to perceive creativity and curiosity enhancements as hypo double majors. However, if we examine what we refer to as the “super hypo” majors—those who have one major in the physical sciences or engineering and one major in the arts and humanities—then we see, as expected, some additional gains for spanners.

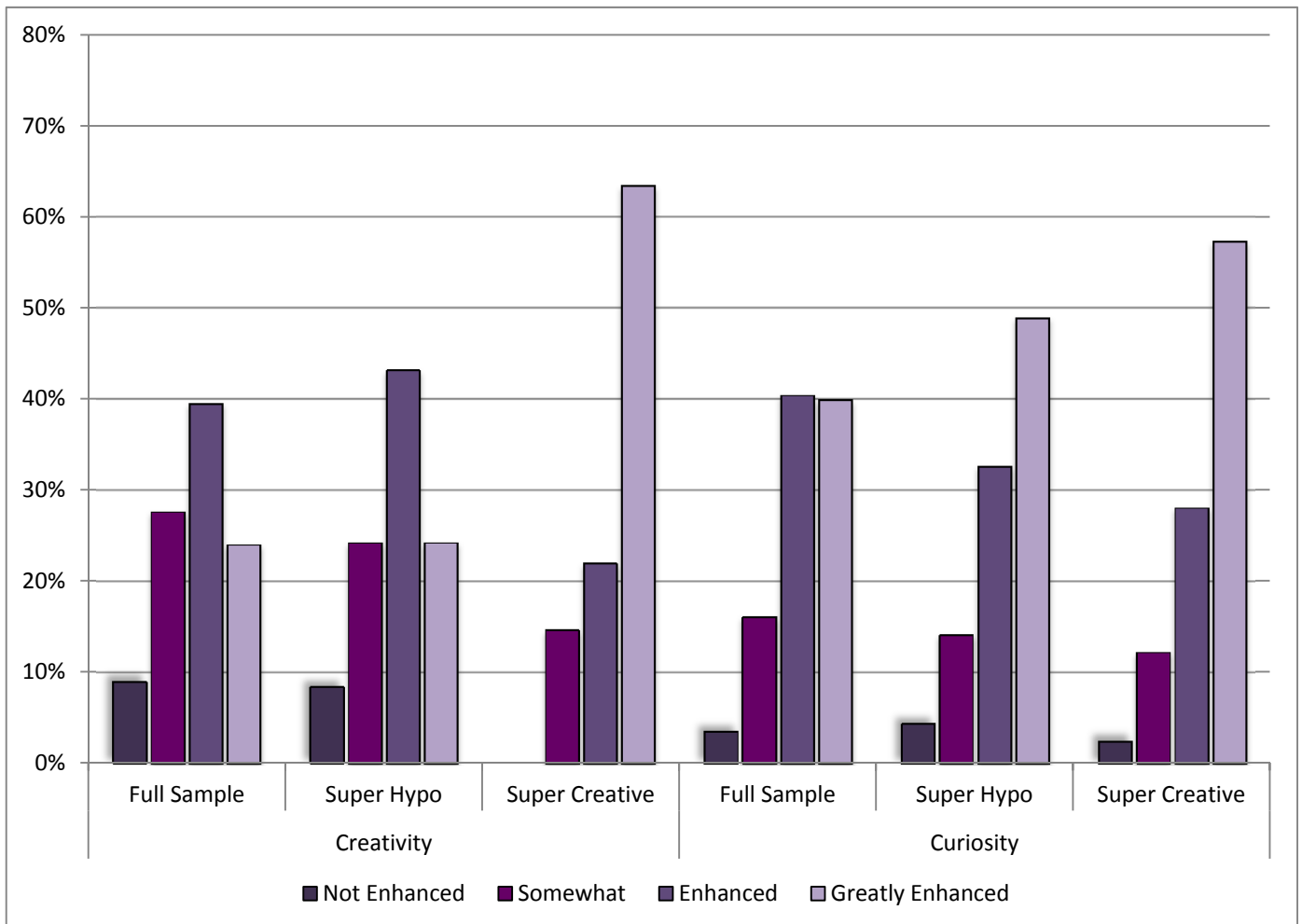
While super hypo majors do not look very different from most double majors in terms of reporting creativity enhancements (“thinking creatively”), Chart 3.9 shows that super hypos are approximately 9% more likely to say that developing intellectual curiosity was greatly

enhanced by their double major combo than the full sample (49% compared to 40%).

These patterns are even stronger when we look at a slightly differently worded question. Fifty-one percent of the full sample strongly agreed that they “think about things differently because of their double major combination” compared to 58% of the super hypo majors. Similarly, 41% of the full sample said they strongly agree that “I am more creative because of my double major,” compared to 56% of the super hypo spanners (Chart 3.10). We conclude that there are modest differences between the super spanners (art and humanities/science combos) and the deepeners (hyper double majors), and virtually no difference in creativity outcomes between regular hypo and hyper double majors.

From our focus groups, students who double major across different domains of knowledge (what we are calling spanners) felt that their major combination “opened them up” and gave them multiple perspectives from which to consider their school work and life more generally. Becca (Art and Social Work) noted, “The added social work major just enhances me because I feel like it broadens my horizons. I can see things on different sides.” Elizabeth (Political Science and Psychology) agreed: “I think my double majors have helped me be more open-minded about different situations...” And finally, Scott (Economics and Psychology) remarked, “it has opened up a lot of new roads, just made it so you can look at more things.”

Chart 3.9 Perceived Impact of Double Majoring On Creativity and Curiosity

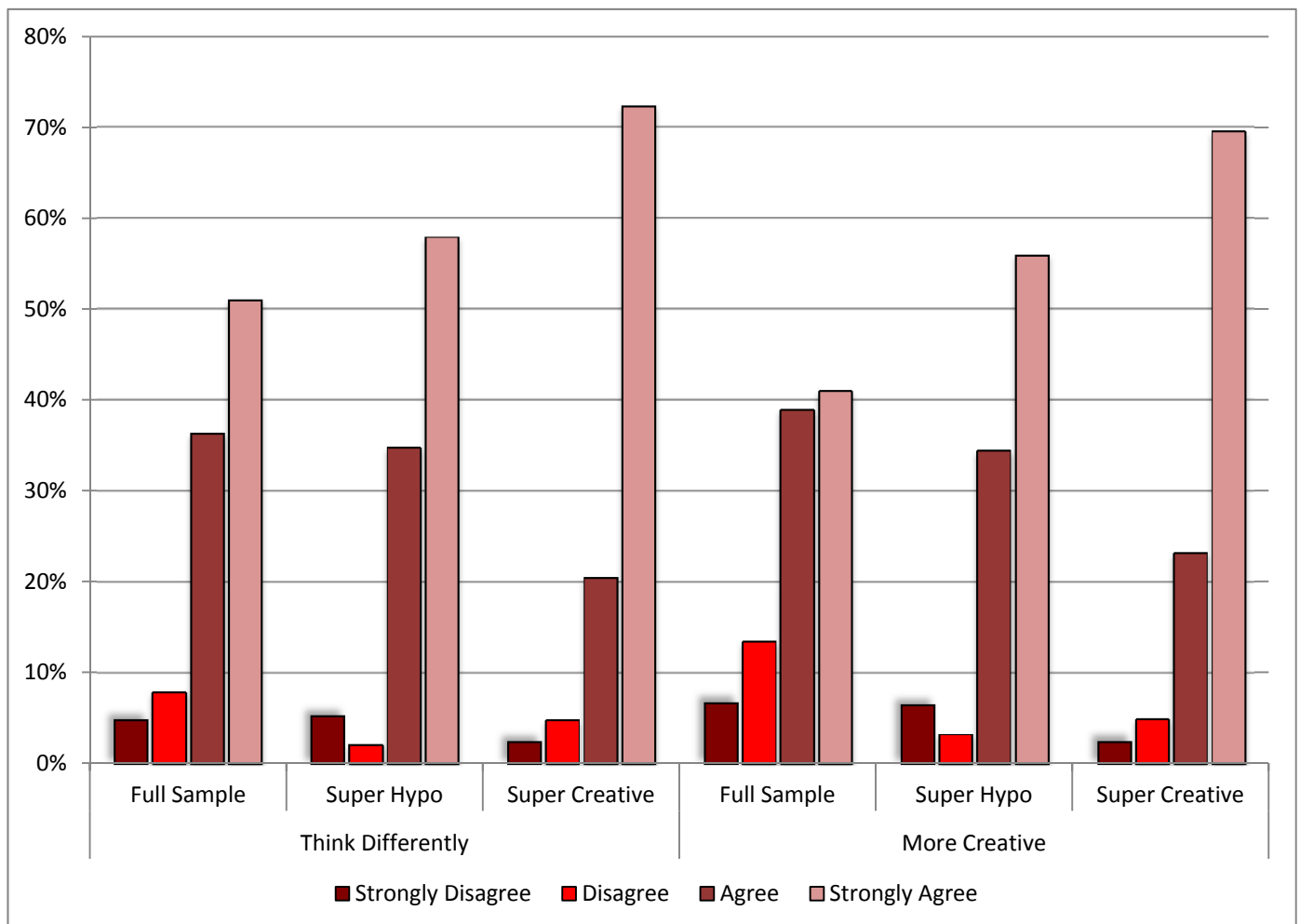


In addition to the “opening up” effect, several double majors discussed the creative influence of intersecting ideas. For example, Evelyn (Economics and Philosophy) said, “I think it definitely makes me more creative in the sense that I am better at drawing connections between subjects or disciplines that seem very different from each other. I am able to get some interesting ideas at intersections between very dissimilar fields.” Richard (Theater and Physics) felt that his double major made him more creative: “Absolutely, just because I’m never stuck in one frame of mind, because I’m always switching back and forth between the two. Just whenever I am thinking about ways to do things, I never only think of what I learned in the class earlier that day, because I had two completely separate and different classes to draw on...”

Lynn (Creative Writing and Theater), whose majors seem to overlap, still says she benefits from the overlap of two different styles of thinking: “There is definitely a creative writing style and a theater major style at this school. But, I have managed to evade both of those stereotypes by doing both at once... finding these ways in which they overlap....I approach problems and come to solutions in different creative ways because of my combination.”

These creative enhancements are even more robust if we only look at the 95 students—about four percent of our sample—who are “super creative” (i.e., they give themselves the highest possible self-rating on a creative skills item). We find, perhaps as expected, an even greater perceived creativity payout. Again, Chart 3.10 shows that 72% of super creative

Chart 3.10 Perceived Impact of Double Majoring on Thinking Differently and Being Creative



students believe they “think differently” because of their double major and 70% believe they are more “creative” because of their double major. These numbers are twenty to thirty percent higher than the full sample. In Chart 3.10, 63% of super-creatives feel “creative thinking” is greatly enhanced and 57% feel like they are more intellectually curious because of their double major, compared to only 24% and 40% respectively for the full sample. And, these super creative students are all driven to hypo-specialize—they choose their majors from different disciplinary clusters. All 95 super-creative students are hypo double majors (spanners); in other words, not a single student chose two majors in the same cluster (deepeners).

Double majors generally perceive creative payouts from their combination of majors, but, as Chart 3.8 shows, they perceive similar benefits in a range of other areas as well—from increased awareness of social and political issues, to improved capacity to express ideas and evaluate arguments, to work-related skills. Another way to think about creativity is whether “creative students” seek out double majors in the first place. Is the double major an attractive option for students who have a creativity bent? Initial evidence suggests that “creative students” are equally or less likely to be double majors as they are to be single majors. On the Creative Personality Scale (Gough 1979), where creativity is measured by a check list of sixteen traits, double and single majors are virtually identical, 5.95 compared to 5.76. On the Creative Activities Scale (Cunco and Okuda 1988), where creativity is measured by student’s self-reported involvement in eighteen creative activities from playing an instrument to inventing a machine), double major and single major students again look similar, each with a CAS score of 28. When we examine desired career and life goals, 56% of double majors say “creativity” is an important consideration for their career path; whereas 62% of single majors say creativity is important. Finally, of those students who

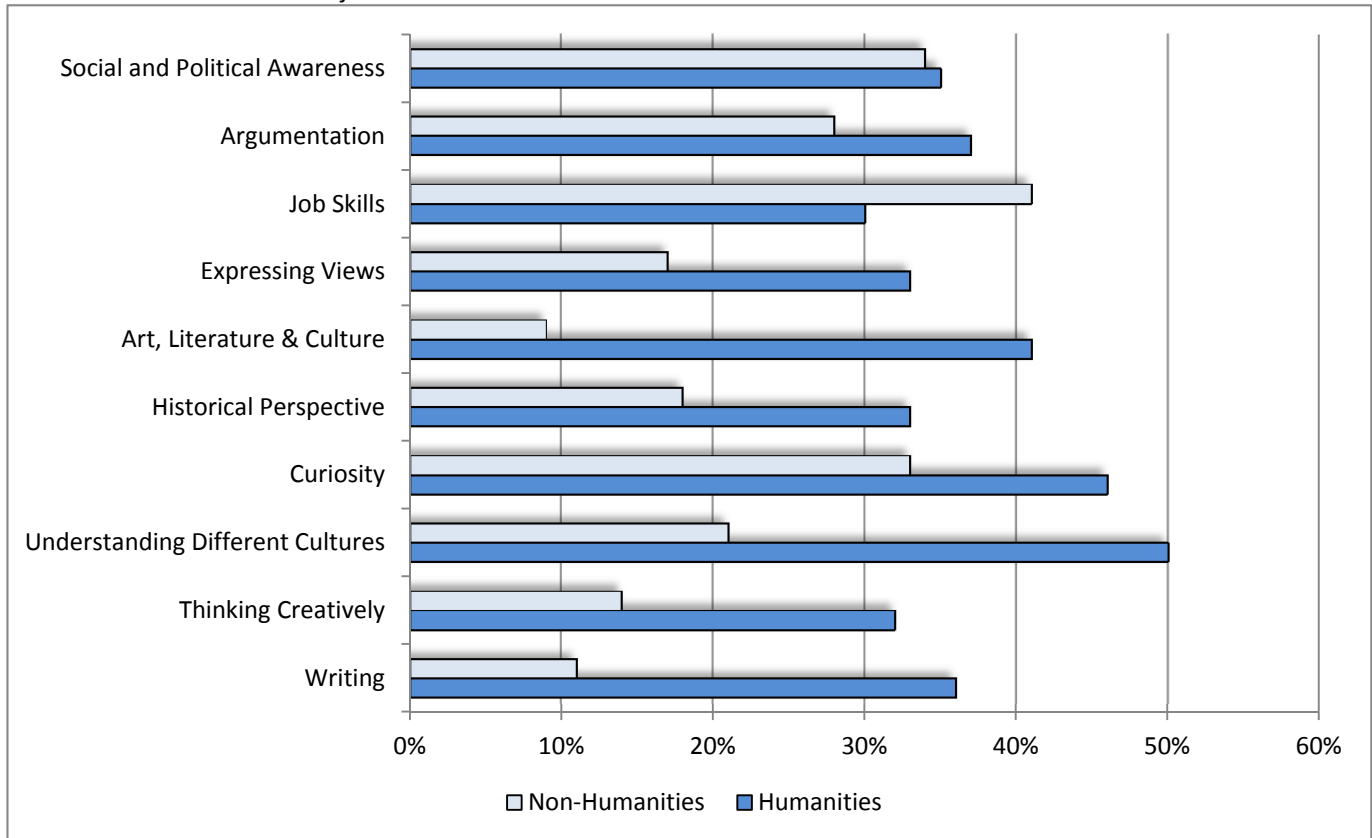
ranked creativity as one of their strongest skill sets, 57% were double majors; of the remaining “less creative” students, 63% are double majors. Essentially, the most “creative students” are more likely to be single majors.

We suspect that the frenetic schedule of the double major is less appealing to some creatively-minded students who seek more time to pursue and nurture their creative interests. Several English and Art majors remarked in focus groups that the demands of their double major detracted from their creative pursuits. Becca (Theater and Social Work) said, “You are just going, going, going. I agree that it decreases my personal creative time.” Diane (Theater and Advertising) agrees, stating, “I feel that now that I have a double major in advertising I am a lot busier and I have less time to work on my own creative projects. It’s kind of frustrating. I want an afternoon to go sit in the park and write. I want a time to sit and be philosophical or whatever.”

Similarly, a student majoring in Geography and English remarked, “Being a double major sometimes hampers my creativity because I feel like to be really creative you have to be fully immersed in something and know it really well. Sometimes, I have two hours to write this paper for English and then I have to switch over to geography for a project due the next day. I just get tired from both classes, and it’s harder to be creative because I don’t have the mental energy to be creative. I’m tired and need to finish this and just move on.”

Thomas (Art and Linguistics) discusses the challenges of having one foot in both majors. “I can’t be completely immersed in art because linguistics involves reading theoretical texts and really hard analytical stuff that takes you out of the artistic frame of mind and I can’t really be immersed completely in either of them.” Vernon (Music and Business) laments, “Often what I find myself sacrificing is that personal time to be the creative person I

Chart 3.11 Comparing Perceived Enhancements for Humanities Double Majors* (Including Art and Language) and Non-Humanities Double Majors



*Students have at least one humanities major.

want to be.” For music majors who are interested in advanced degrees in music, the double major poses a serious obstacle in terms of the time they can commit to their craft. As one musician noted, “In music performance [the double major] is definitely a big disadvantage. Other students who go to conservatories will go and practice for six hours a day. That’s just not possible for me at this point.”

So, creatively-minded students are not more likely to double major, but when they do, they are “spanners,” choosing their majors from across different domains of knowledge; importantly, they seem to reap more creative payouts from their double major combo than their classmates who also double major.

Arts and Humanities Drive the Creativity Gains. Previously, we’ve shown (Chart 3.8)

that double majors generally see a range of liberal arts benefits from their combination of majors—from improved writing skills, to creativity and curiosity, cultural, social and historical understanding, and argumentation and expression. But students also report gains in job skills and work preparation. So rather than conclude that double major students gain specifically in the areas of creativity and liberal arts, we suspect that students are generally satisfied with their choice to double major and display their satisfaction by reporting gains—or at least their perceptions of them—in most areas of learning. But, one theme of this report is that not all students are the same and not all double major combinations produce the same outcomes. Our analysis suggests that the humanities (English, history, language, art, philosophy, religion, classics) produce the greatest gains. When we compare students who have at least one humanities major with those who do not major in the humanities, we see

significant differences in the perceived benefits for the former group (see Chart 3.11 above).

While 32% of humanities double majors report that their ability to think creatively was “greatly enhanced” by their double major combo, only fourteen percent of the non-humanities double majors report this enhancement. In fact, humanities double majors report significantly more benefits in almost every area we measured *except* for job skills.

The perceived benefit of double majoring with at least one humanities focus corresponds with the learning outcomes students report for each of their majors separately. In other words, the perceived benefit is directly related to the specific learning that takes place in humanities classes, not necessarily from the synergistic learning that supposedly happens when different disciplines come together. When students major in an art or humanities discipline they are much more likely (sometimes three or four times more likely) to strongly agree that coursework in their major allows them to take assignments in multiple directions, make connections between course units, express creativity, see things from multiple perspectives, pursue something they are curious about, take risks, be intellectually playful, show initiative, and work independently.

Charts 3.12 through 3.15 show the percentage of students in each major who strongly agree with four different learning opportunities: 1) “you can take assignments in multiple directions;” 2) “coursework allows me to express my creativity;” 3) “coursework requires me to generate new ideas;” and 4) “coursework allows me to take risks in my assignments.” These elements of courses relate to learning outcomes—dealing with ambiguity, expressing creativity, generating ideas, and taking risks—are core components of a creative education (Jeffrey and Craft 2004; Sawyer 2012). The different color bars in Charts 3.12 through 3.15 represent whether the person is reporting for a single major, the

first of two majors, or the second of two majors (first and second is determined by the order in which they declared their major). If we just examine single majors (green bars), we see dramatic differences in all the charts—for example 91% of art majors and 77% of English majors strongly agree that coursework requires the generation of new ideas; in contrast, 15% of economics majors, 26% of engineering majors, and 39% of biology majors agree (Chart 3.12). These numbers are even more pronounced when we look at creative expression—91% of art majors and 74% of English majors strongly agree that coursework allows them to express their creativity (Chart 3.13); on the other hand, three percent of economics majors, five percent of engineering majors, and eight percent of biology majors strongly agree. Charts 3.14 and 3.15 show similar trends.

Even though successful engineers, scientists, and business leaders demonstrate creativity in their work, when it comes to training and education, the arts and humanities have a seeming monopoly on creative learning outcomes in the classroom. In fact, the differences are so stark that we suspect that any double major who includes an art or humanities major in their combination will perceive large gains in a range of creativity and liberal arts outcomes from their joint combination of majors (which is what we find in Chart 3.11). We call this an “additive” effect. A metaphor for this idea might be that if you add a colorful hat to an otherwise drab outfit, you will perceive the entire outfit to be more colorful as a result.

But, a fascinating finding from Charts 3.12 through 3.15 is that there is also a more generalized “spill-over effect” from double majoring (whether in the humanities or otherwise). Eight percent of biology single majors report that their coursework allows them to express their creativity; but when biology is their second major (middle bar), 43% report

Chart 3.12 Percentage of Students Who Strongly Agree that Coursework Allows Them to Generate New Ideas

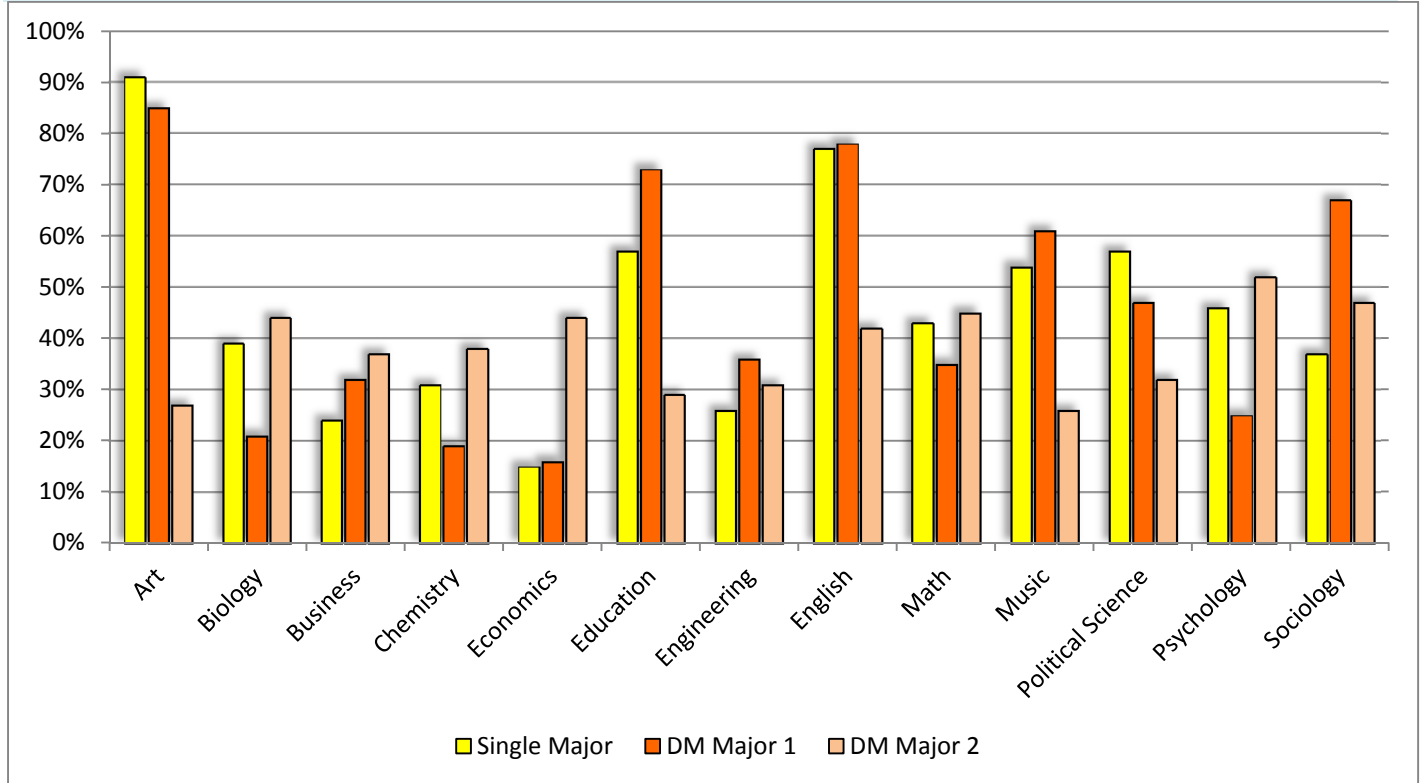


Chart 3.13 Percentage of Students Who Strongly Agree That Coursework Allows Them to Express Their Creativity

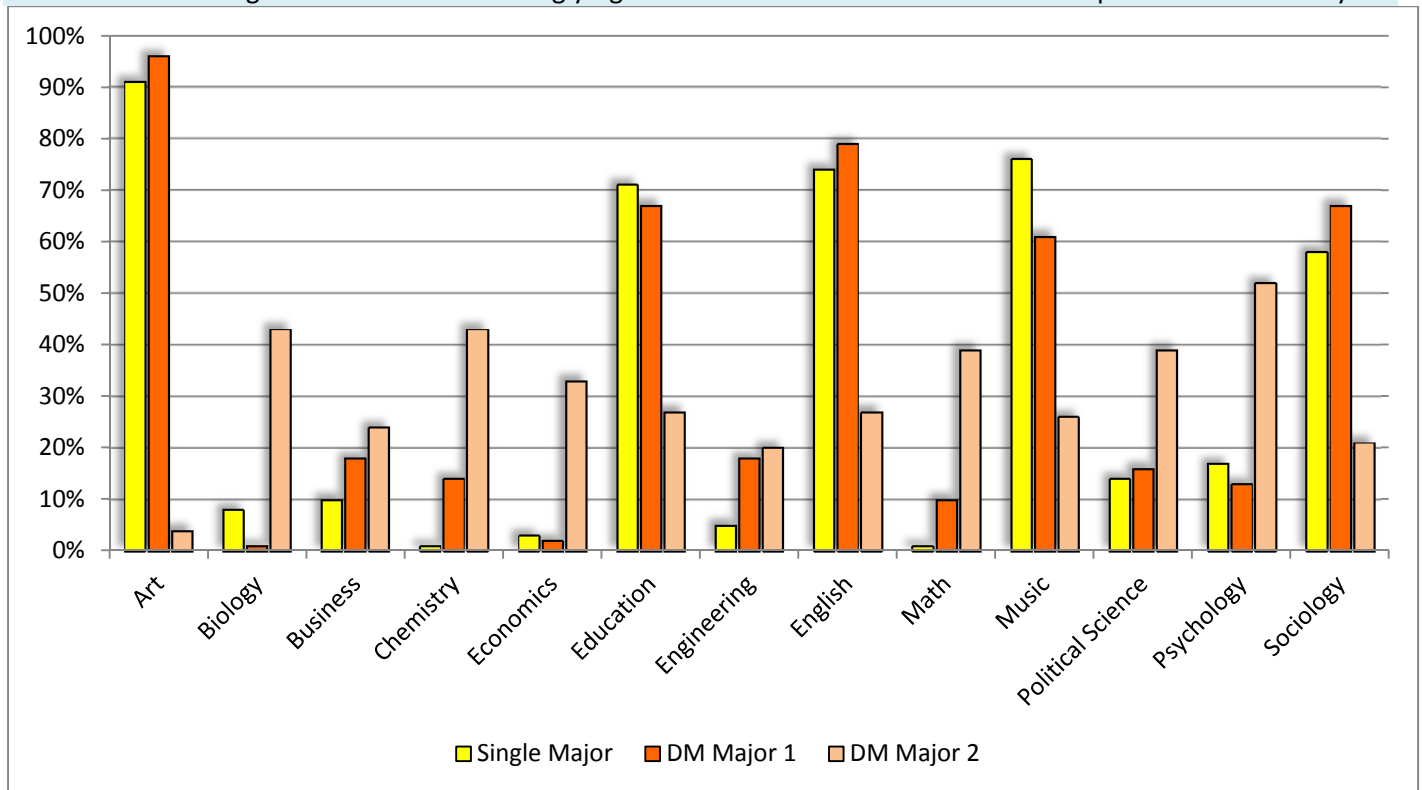


Chart 3.14 Percentage of Students Who Strongly Agree That Coursework Allows Them to Take Risks

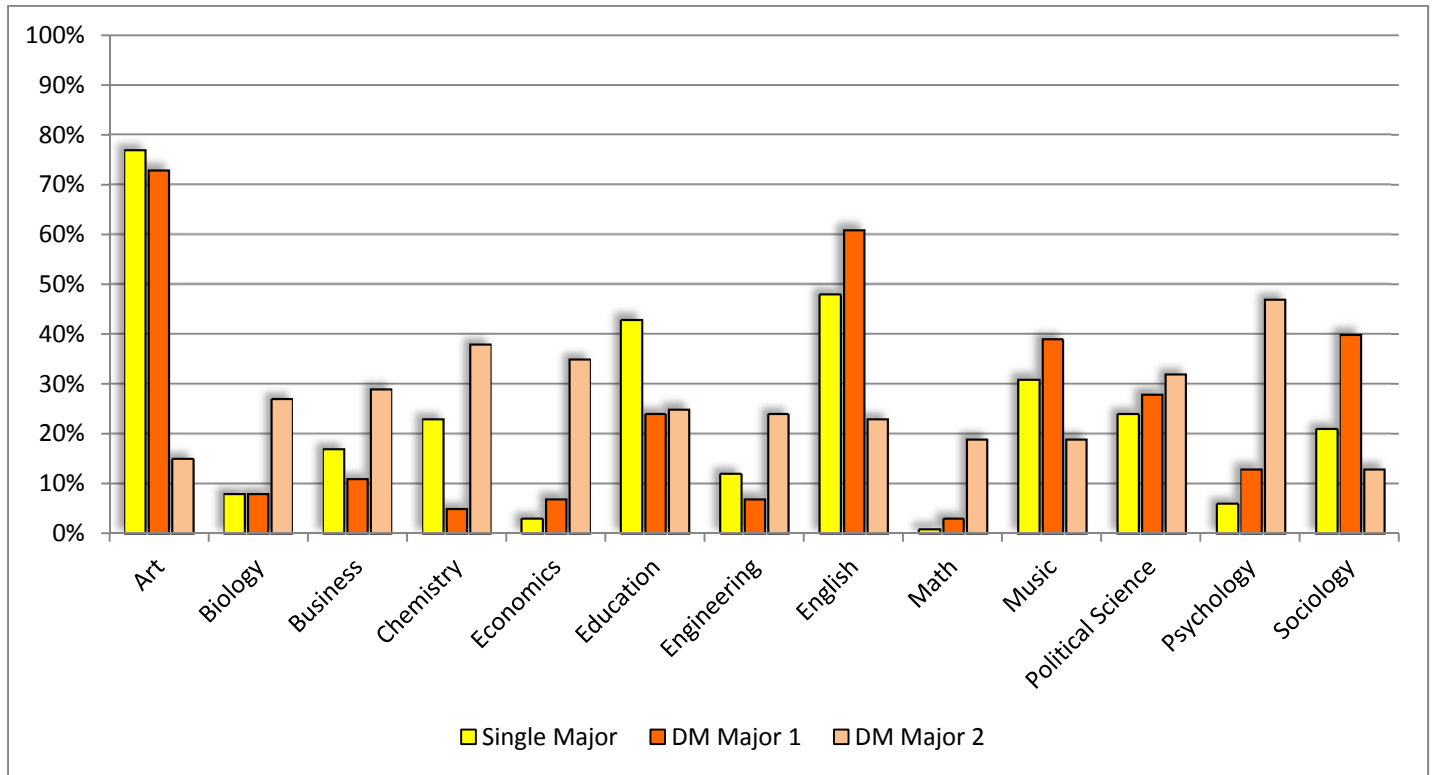
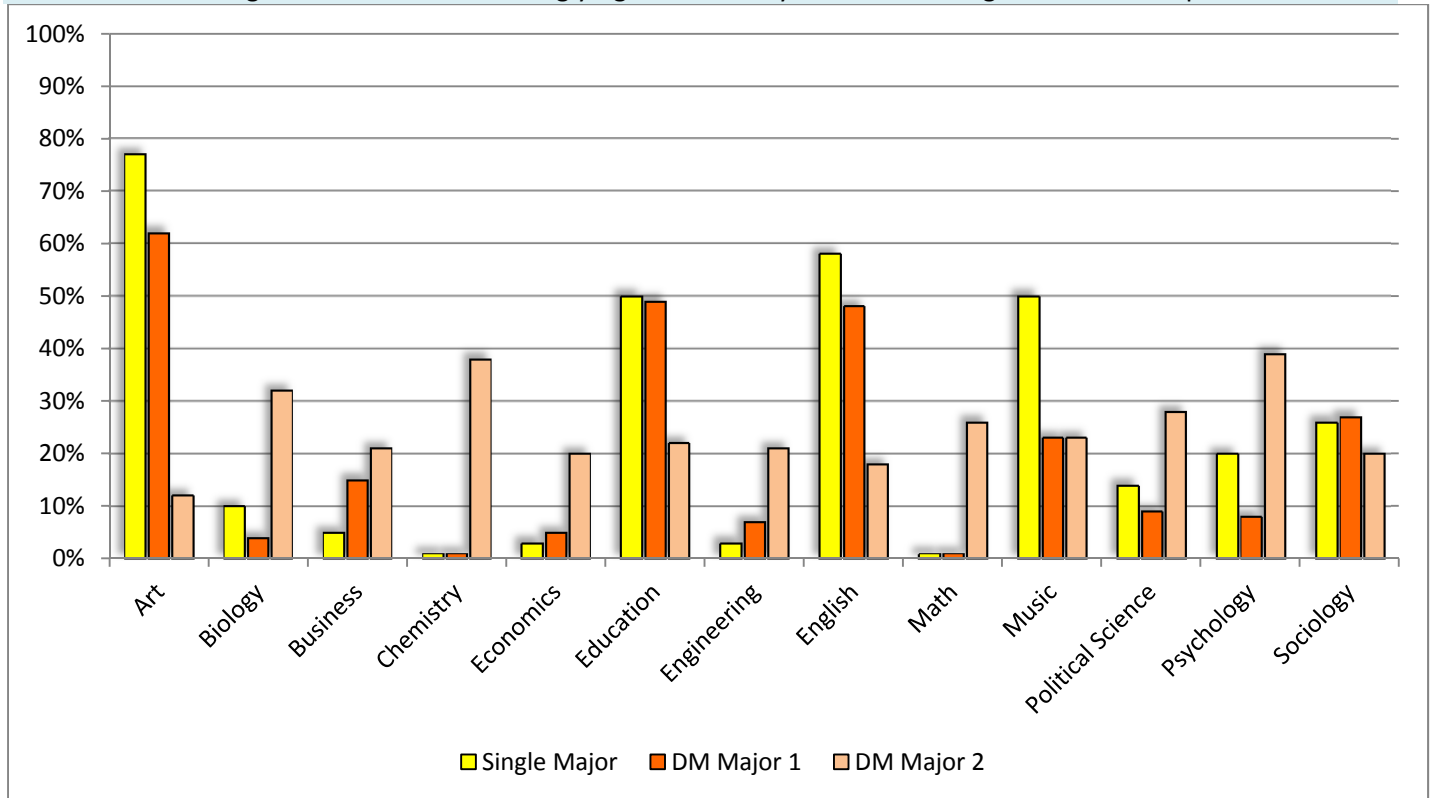


Chart 3.15 Percentage Of Students Who Strongly Agree That They Could Take Assignments in Multiple Directions

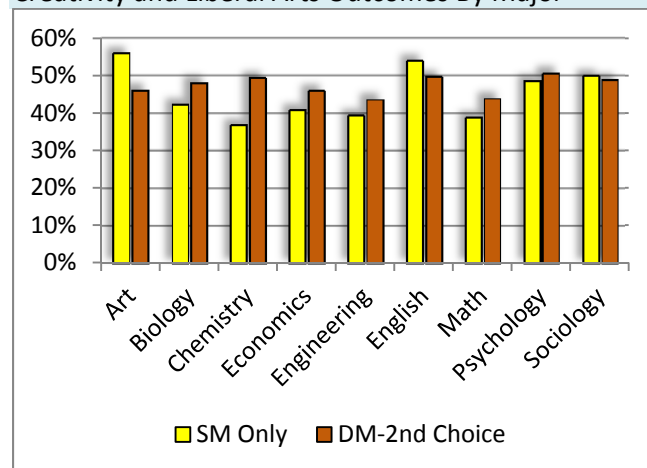


that their biology coursework allows them to express their creativity (Chart 3.13). When it comes to taking risks, one percent of single chemistry majors report that they can take risks with their assignments, whereas 38% of students who take chemistry as their second major report being able to take risks with their chemistry assignments (Chart 3.14). For math majors, only one percent report that they can take assignments in multiple directions when math is their only major; when it is their second major nineteen percent report that this happens regularly in their math classes (Chart 3.15). The opposite trend seems true for the arts and humanities—across all four learning outcomes reported here (ambiguity, creativity, idea generation, and risk taking), arts students and English students report substantially more creative learning outcomes from their arts and humanities classes when they are single majors than when they are double majors, especially when they add the art or humanities major as their second major.

Another way to view this pattern is to look at a chart showing the scaled score from an expanded list of fourteen creative and liberal arts outcome measures (see Appendix 5.2, Question 34). The average score on this scale is a 46.7. Chart 3.16 reveals that English and art have the highest scores when only looking at single majors; but when English and art are chosen as second majors the scaled score drops significantly (from 56 to 46 for art and 54 to 50 for English). Social science (sociology and psychology) single majors score slightly above the mean—50 and 49 respectively; when examining social science second majors, their scores remain relatively unchanged. On the other hand science majors start at scores well below the mean (chemistry is 40, biology is 42, math is 39 and engineering is 39); but when these subjects are selected as second majors, the scores jump up to 50, 48, 44, and 44 respectively. To summarize, you get a bigger creativity payout from your art and humanities courses when they are your first and only major then when they are your second major.

For the sciences, you get a “spill-over effect”: sciences courses have more creative learning outcomes when they are paired with another major than when they are taken alone (single majors).

Chart 3.16 Percentages Of Students Who Had High Creativity and Liberal Arts Outcomes By Major



If we refer back to some of the comments made in focus groups, we can tentatively conclude that many students perceive that their double major requirements limit their time to think deeply about their creative pursuits—whether performing, making art, or writing. When arts or English majors add another major, it detracts from their ability to deeply immerse themselves in their “creative major.” On the other hand, we suspect that when science students choose to double major (unless they “double down” in another science) they increase the likelihood that they will add a set of courses that approach learning in a more open, flexible, and creative way. The experience in these other courses seems to have a positive “spillover effect” on their science courses. These students actually experience science differently because of the presence of a second, often non-science major. When scientists are exposed to artists, they often incorporate the perspectives of artists into their scientific work. In fact, the former president of Georgia Tech, Bill Clough, once said that he felt that incoming engineering students who also had artistic backgrounds would make better engineers. Thus far we have discussed the potential

creative payout of double majoring by focusing on creative thinking, multiple perspectives, generation of new ideas, risk taking, and a variety of other “divergent” thinking attributes. But, to what extent are there positive synthetic creative outcomes or convergent thinking? In other words, do double major students bridge across their courses and integrate and synthesize knowledge?

In general, a fairly high proportion of double major students report synthetic outcomes. In Chart 3.17, a majority (59%) of the full sample agreed with the statement, “my teachers encourage me to apply and use knowledge across my two majors” and 41% disagreed. Similarly 82% agree that they can “easily think of an assignment that would allow me to draw on skills or knowledge gained in both of my majors,” and 63% agreed that “I have completed an assignment for one of my major’s classes that, with some reworking, would also be relevant to a class in the other major.” It is worth noting that while 81% of students can think of integrative assignments across majors, only 57% say they are actually encouraged by teachers to make such connections. We address this issue below in reporting comments from our focus groups.

One reason that students report being able to integrate across majors is 32% of all double majors pick subjects in the same domain of knowledge—e.g., two arts and humanities majors; two physical science majors; two social science majors. As noted above, we call these students hyper double majors because they specialize in one domain of knowledge.

Many of these students told very compelling stories about how well their two majors reinforced each other. For example, Kal (Sociology and Psychology) discussed the connection between her two majors: “I was starting to see that psychology was too individualistic and I was starting to see the

Chart 3.17 Student Agreement With The Statement “My teachers encourage me to apply and use knowledge across two majors”

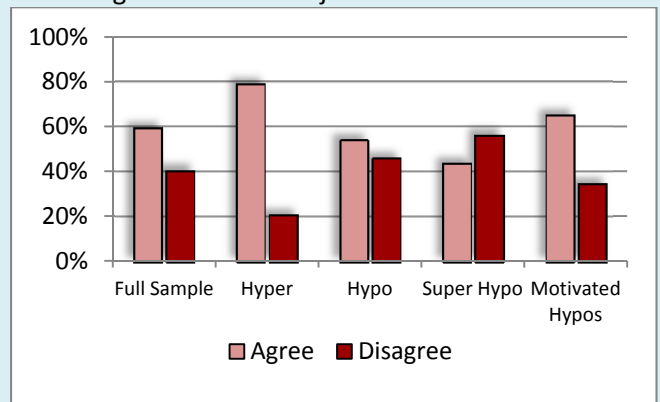


Chart 3.18 Student Agreement With The Statement “I can think of an assignment drawing on skills or knowledge in both majors.”

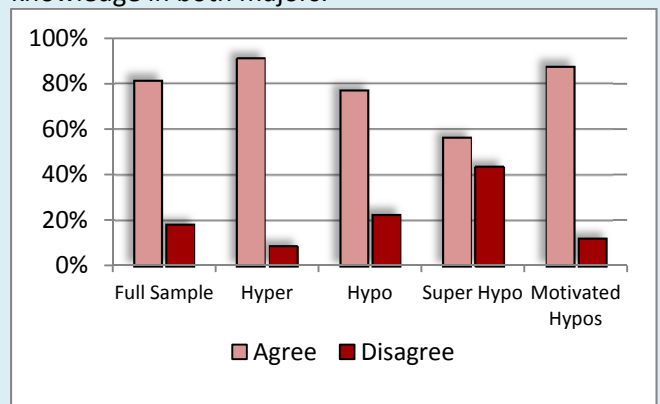
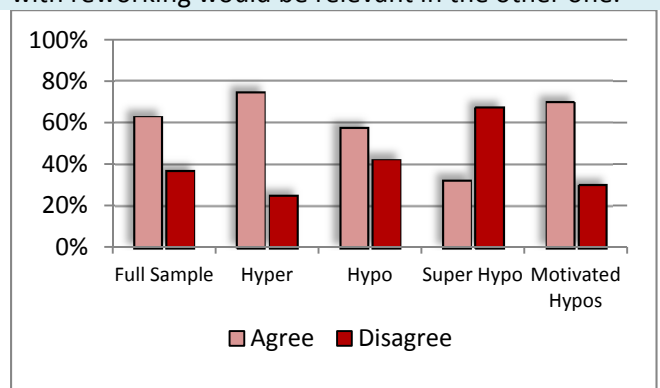


Chart 3.19 Student Agreement With The Statement “I have completed an assignment for one major that with reworking would be relevant in the other one.”



**In charts 3.17 through 3.19, super hypo double majors refer to those whose double major combination includes an arts/humanities degree and a science degree; motivated hypos refer to hypo double majors who are motivated to choose their double major combination in order to get exposure to subject areas that complement one another.*

point of sociology. I thought that I was unbalanced and if I took enough courses in sociology then I could have a greater understanding, a more complete picture of society and human beings.”

Or take Sophie (Economics and Psychology) who felt that her psychology major helped her get behind the numbers and equations that describe economic phenomena. She noted, “I wanted to understand the human factor. Psychology has definitely helped. Why did Black Monday or the Great Depression happen?” Liz (Art History and Design) decided to write her honors thesis on historical type-based designs and noted how the topic lay perfectly at the border between her two majors. Finally, Jessie (Biomedical Engineering and Electrical Engineering) discussed how his biology courses help him ask deeper questions in his engineering courses. “In an audio engineering class about speakers and microphones, I can ask questions about how the ear works; in my visual systems class, I can ask good questions about the biological aspects of the eye.” These examples clearly demonstrate that hyper-specialized students see many connections between their fields of study and often use knowledge and methods from one domain to inform the questions and assignments they pursue in their other major.

But, can students make connections and integrate learning across very different domains of knowledge, what we call hypo double majors? Across all three integrative learning questions (Charts 3.17 through 3.19), we find that majorities of hypo students still report being able to integrate across their majors. We also find fairly large differences between our hyper and hypo majors, with between 14% and 25% fewer hypo majors (spanners) agreeing that they are able to integrate across majors compared to hyper majors (deepeners). And, when we look at students who major in very different areas, or what we refer to as super hypo majors (those who have one arts

and humanities major and one physical science major), we see even greater drops in the percentage of students reporting being encouraged to or being able to integrate across their areas of study. For example only 33% of super hypo majors agree that they can rework assignments in one major to be relevant to another, whereas 63% of the full sample agree.

In spite of these survey results, in focus groups, many hypo double majors provided compelling examples of integrative and synthetic learning. Tim (Economics and Geography) talks about the creative advantage of majoring across different domains: “Being a double major might give me a slightly unique perspective. I find myself talking a lot about economic issues in my geography class. I don’t consider myself a terribly creative person though, and I think being an Econ major encourages that.” While Tim sees his economics major informing his geography classes, Katie, also a Geography major, talks about the influence of her English double major: “English places so much stock on clever little ways of saying things or defining certain terms or interesting word play. It forces you to be creative. My English major creeps into geography; it affects the writing I do for geography and made it stronger and helps me analyze and describe things differently.”

Veronica is an example of a super-hypo double major, combining very different domains of knowledge—in her case Religion and Chemistry. She sees a direct connection between her two majors. “I think the double major has made me more creative. Science people follow a methodology, but they need to be creative if they are to make an impact. I have gotten to travel for my religion major to Turkey and Italy and Israel. I guess it made me more creative in terms of how I think about people and how I translate that into science. Just the methodology of studying religion translated very well into being creative in the sciences and how I design experiments.” In a more practical way, Sara (Art and Biology)

notes that her anatomy classes have helped her notice and interpret paintings differently. “I can see anatomical details with more ease than others.” And while Sara uses biology to improve her humanities major (Visual Art), Caroline (French and Math) uses her humanities major to help her become a better doctor. She discusses the creativity needed to deal with patients. “When I look at a patient I never want to be thinking ‘oh this is just strictly analytical’ and not considering that this is a person with a story. Having two approaches to creativity – the methodological and analytical with math and the humanistic side with French – gives me a two-way attack on creativity with some of my patients.”

Leigh (Math and Sociology) reports that “because my majors are so different I have the ability to be creative and see things in different ways. Having two majors makes you more confident using one set of ideas in a different context. For example, perhaps in math class we need to understand why a mathematician in history was pursuing some problem. Let’s say it was related to some sociological factor happening at the time. Because I have expertise in this area as a sociologist, I have the confidence to bring this up in this different setting. It is important to be competent enough to feel comfortable bringing in another perspective.” Importantly, Leigh describes how deep expertise in another subject gives her the confidence to bring up “different” perspectives in her math classes. Challenging conventional approaches or raising unorthodox questions (one aspect of creativity) requires taking risks, and such risks seem easier when armed with the expertise of a second major. And David (Math and Music) describes the synthetic creativity between the two. He uses the right side of his brain to think creatively in music and then “I apply that to math things. Also I think math has made me a little more analytical about my music which in turn helps my creativity.” Finally, several music, theater, and art majors discussed how these majors taught

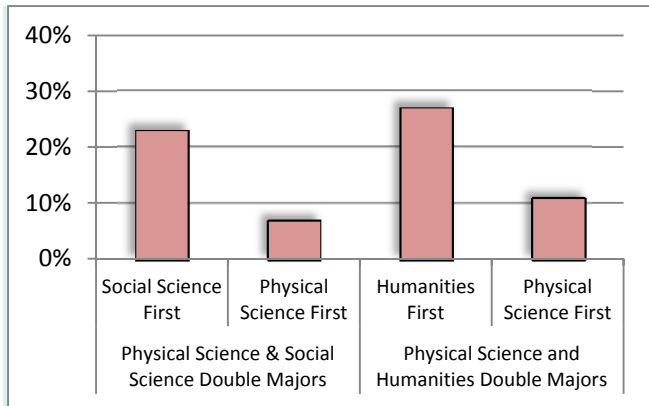
them the art of presenting ideas in public as well as how to work collaboratively in groups, skills which gave them a distinct advantage in their business majors.

In summary, most students indicate they are able to make connections across their majors. However, making such connections becomes increasingly difficult as students choose subject areas that are more dissimilar—such as art and science. Still, many students find creative ways to integrate their majors and provide compelling examples of synthesizing their science and art/humanities classes.

Interestingly, a student’s motivation for choosing a double major might have a greater influence on learning outcomes than the actual choice of what to study. For example, the last bars in Charts 3.17 through 3.19 show that when we look only at those hypo double majors who indicate that they chose their major combination in part to “get exposure to two subject areas that complement and reinforce one another” (what we refer to as motivated hypos), we see reported gains in integration more similar to hyper double majors. Students who are motivated to choose two majors that complement one another do, in fact, make connections between their majors even when they choose subjects that are very dissimilar.

Earlier in this report we showed that perceived classroom experiences differed depending on the order in which students declared their two majors. We find similar results with regard to synthetic or integrative learning. In particular, physical science students are more likely to report that they are encouraged by teachers to apply knowledge across their two majors when they pick up a science major second (see Chart 3.20).

Chart 3.20 Effects of Ordering on Percentage Who Strongly Agree That Teachers Encourage Application Of Knowledge Across Two Majors.



If we look at the social science-physical science cluster (e.g., students who have one social science major and one physical science major), 23% of students who choose their social science major first say teachers encourage integration, whereas only seven percent of students whose physical science major comes first say they are encouraged to make connections. The same pattern is true for the arts and humanities-physical science cluster – 27% of students who start with a humanities major are encouraged by teachers to make connections; only eleven percent of students who start with a physical science major say they are encouraged to make connections.

We suspect that the current instructional practices associated with the humanities and social sciences are more conducive to broader, synthetic thinking than coursework and instruction in the sciences. If students begin with a major that encourages a broader mindset, it will be easier to see connections to their second major than if they begin with a major that requires a more exacting and narrow focus. When science students pick up a humanities or social science second major they might see added enhancements in terms of creativity and liberal arts outcomes (as discussed above), but they are much less likely to feel encouraged to make connections.

BREADTH OF EXPOSURE TO KNOWLEDGE

Breadth Matters. A recent Pew Research Center study showed that 52% of college graduates believe the main purpose of college is to help individuals grow personally and intellectually (Taylor et al. 2011). Based on their survey of academic deans and officers, two of the highest learning priorities for helping students grow were developing critical thinking and other targeted skills, and exposing students to a broad range of subject matter (breadth). In many ways, these objectives are not only fundamental to the goals of any specific general education system, but are commonly perceived goals of baccalaureate level training more generally. The latter of these aims—breadth—sits at the heart of the creation of the type of Renaissance student many associate with a baccalaureate degree and the intellectual growth it fosters.

According to Goyette and Mullen, “liberal learning values breadth of knowledge over narrow specialization and holds an appreciation of learning for its own sake rather than utilitarian ends” (2006:498). That said, a liberal education—particularly one characterized by exposure to multiple domains of knowledge—can have utilitarian ends as well. Rosabeth Kanter’s prescription for an “American corporate Renaissance” focuses on innovators who are “broader-gauged, more able to move across specialist boundaries, comfortable working in teams that may include many disciplines, [and] knowledgeable about how to manage ambiguous assignments and webs of interdependencies. In short, Renaissance people . . . encouraged by a strong, affordable educational system that combats narrow vocationalism and permits people the luxury of studying a variety of fields before becoming too specialized” (1983:368).

While the centrality of any institution's broad-based liberal arts training is considered essential to the legitimacy of its entire academic enterprise, very little research has been done on the degree to which student course-taking patterns actually reflect this centrality. Which majors are associated with more or less academic breadth? And, importantly for our purposes, do students become more or less broad when they add a second major?

Domains of Knowledge. Virtually every course a student takes can be categorized into one of nine liberal arts domain-of-knowledge classifications: artistic expression (ARTS), literary criticism and composition (READ), historical consciousness (HIST), foreign language and culture (LANG), moral and philosophical reasoning (MORL), scientific inquiry (SCIE), quantitative literacy (MATH), social analysis (SOCS), and diversity and global studies (WRLD).

Majors in all three liberal arts divisions—humanities and arts, social sciences, and natural sciences—have requirements that draw on a number of these domains, thereby potentially adding breadth as well as depth to the student's training. For example, classics majors take literary criticism, foreign language, moral/philosophical reasoning, and historical consciousness courses. Anthropology majors may be required to take courses exposing them to modes of inquiry for historical, social, or scientific analysis; most are also required to take one or more quantitative literacy (i.e., statistics) courses. While most physical science majors spend much of their time in scientific analysis and quantitative literacy courses, some majors (e.g., environmental science) also take social analysis or moral reasoning (e.g., environmental ethics) courses.

With some minor exceptions, even the many courses taken in "practical" arts disciplines fit one or more of these nine "liberal arts" domains of knowledge. Most engineering

courses are, fundamentally, scientific analysis courses. On campuses both with and without business programs, students are gaining "professional" knowledge for business careers in social analysis (e.g., international finance), quantitative literacy (e.g., cost accounting), and even artistic expression (e.g., graphic design) courses.

Measuring Breadth of Knowledge. In order to measure breadth among these domains of knowledge, we use a measure of concentration called the Herfindahl-Hirschman Index (see Technical Appendix for more detail on this index). A student with a set of courses that is perfectly balanced across the domains of knowledge (i.e., one course in each domain) would have an index score of .10, which is generally the floor for most analyses using the index. If a student takes all of her classes in one domain, she would have a score of 1.0, the top of the range for this index. The higher the HHI, the more concentrated students' course selection are and the less breadth across the curriculum they have.

Breadth of Knowledge and Double Majoring. Based on an analysis of more than 200 student transcripts from multiple institutions, we were able to compare the "liberal arts" breadth of different curricular combinations. Business majors (HHI=.264), with their courses in business communications, economic theory, and accounting principles, have as much breadth in the nine liberal arts domains as any social science (HHI=.247) or humanities (HHI=.258) major. Of the courses business majors might take in their academic career, similar numbers of courses are taken in the three broad areas of liberal-arts inquiry: twelve in the humanities, nine in the physical sciences, and sixteen in the social sciences. We suspect that other professional specialties, like communications and education, would be similar in terms of breadth.

In sharp contrast to business majors, the average engineering major (HHI=.504) is exposed to virtually no liberal arts knowledge beyond that taught in physical science courses. If one considers that most of their humanities classes are actually “technical writing” or “technical design” courses, it is likely that they are learning to communicate effectively, but are not exposed to much in terms of broad artistic or literary aesthetics. Other science-oriented professional specialties, like nursing and agricultural production, would likely suffer from the same impediment. This trend towards academic concentration in engineering is seen as well in the “science” side of the liberal arts and science continuum.

What happens to breadth when students add a second major? When students double down in the sciences, adding a second major in another science, they reduce their exposure to courses that expand their awareness of economic, political or social issues, foreign language and culture, diversity and global studies, and literary criticism and composition. If the “problem” of vocationalism is *concentrated knowledge*, the lack of breadth we see among the “liberal arts” science majors suggests that those fields—biology, chemistry, physics, mathematics—are as vocational (if not more so) as some of the “practical arts”—like business or engineering. And when students “double down” (hyper-specialize) in science,

Table 3.1 Liberal Arts Domains of Knowledge and Concentration Indexes for Key Curricula

	HHI	LIBERAL ARTS DOMAINS OF KNOWLEDGE (PERCENTAGE-SHARES)									
		ARTS	READ	HIST	LANG	MORL	SCIE	MATH	SOCS	WRLD	MISC
Liberal Arts Core	0.107	7.9	11.6	9.7	10.5	7.4	14.6	10.3	12.9	5.3	9.8
Business	0.264	3.9	5.2	5.9	10.2	4.7	4.6	18.0	39.5	0.5	7.5
Engineering	0.504	0.8	4.4	2.1	0.3	3.0	68.4	12.3	4.3	0.2	4.2
Humanities Majors											
Specialization	0.258	2.5	40.4	11.0	8.0	5.1	10.9	3.8	8.4	5.7	4.3
Hyper-specialization	0.240	3.5	37.2	8.9	9.8	12.3	5.3	3.0	5.3	6.8	8.0
Hypo-specialization	0.254	6.5	19.0	3.4	9.4	6.0	20.1	5.8	21.5	3.5	4.7
Social Science Majors											
Specialization	0.247	4.0	6.8	6.0	8.0	5.9	10.4	8.3	40.0	4.7	5.8
Hyper-specialization	0.375	1.3	4.5	5.5	5.4	5.0	7.5	5.6	57.4	3.0	4.9
Hypo-specialization	0.260	4.0	13.4	3.9	7.1	4.2	19.8	7.1	31.8	3.3	5.4
Physical Science Majors											
Specialization	0.348	2.4	5.8	5.4	4.4	3.2	54.3	9.4	6.6	3.3	5.1
Hyper-specialization	0.408	4.1	4.1	4.8	2.1	4.6	60.9	8.6	4.1	1.5	5.2
Hypo-specialization	0.273	5.7	10.3	4.0	6.5	5.2	34.7	9.7	16.3	2.0	5.7
Cross-Majors											
Humanity & Soc Science	0.243	5.0	21.4	3.4	9.8	5.0	7.1	3.5	35.6	4.7	4.5
Soc Science & Science	0.280	2.9	3.8	4.6	3.8	3.2	34.9	11.3	27.3	1.7	6.4
Science & Humanity	0.267	8.3	16.3	3.4	9.0	7.2	34.6	8.3	5.8	2.2	4.9

Key: Herfindahl-Hirschman Index (HHI) • Artistic Expression (ARTS) • Literary Criticism and Composition (READ) • Historical Consciousness (HIST) • Foreign Language and Culture (LANG) • Moral and Philosophical Reasoning (MORL) • Scientific Inquiry (SCIE) • Quantitative Literacy (MATH) • Social Analysis (SOCS) • Diversity/Global Studies (WRLD) • Miscellany (MISC)

they see, as expected, even greater reductions in breadth.

The significant reduction in academic breadth caused by hyper-specialization in the physical sciences can also be observed in the social sciences. Specifically, when psychology majors add another social science major (e.g., sociology), they have less breadth than psychology single majors and are as concentrated as biology single majors, just in different ways. The increase in social analysis courses (about five) is balanced by equal losses (about one course each) in both humanities and physical-science oriented domains of knowledge.

On the other hand, social science majors who are either single majors or who add a second non-social science major (hypo double majors) are uniquely situated in terms of breadth. Social science single majors take as equal a share of courses across the nine domains as either humanities single or double majors. As suggested earlier, this is a function of the competencies in history, foreign languages, composition, and quantitative literacy required by many social science fields. A successful sociology major, particularly one planning to pursue a graduate degree, would need to have both exposure to and some mastery of all of these very different domains of knowledge. This unique characteristic of social science majors makes it a particularly potent (in terms of adding breadth) addition to either a humanities or physical science major. In both cases, the student's course load becomes less concentrated when combined with a social science major; this is especially true for the physical sciences.

While hyper-specialization in the social or physical sciences negatively impacts a student's exposure to a broad range of academic knowledge, this doesn't seem to be the case with hyper-specialization in humanities fields. In fact, neither the addition of a related major

(e.g., history) or a dissimilar one (e.g., physics) has any significant impact on the breadth of exposure represented in English majors' course-loads. This is largely because humanities is a more diverse area of concentration than social and physical sciences. Humanities classes cover a wider variety of domains of knowledge than the other disciplines. Humanities majors begin broad and when they add another major they remain broad—perhaps enrolled in a different portfolio of courses, but no less broad than before.

As already noted, in the physical sciences, the type of double major combination has important consequences for breadth. When science majors “double down” and hyper-specialize, they tend to deepen and not broaden. On the other hand, when their second majors are outside of the sciences, we see significant broadening, especially in humanities related domains of knowledge—artistic expression, literary criticism and composition, foreign language and culture, and moral and philosophical reasoning. Social science majors also see significant declines in breadth when they add a related second major (hypo). But adding an unrelated second major (hypo) does not offer an additional broadening.

In summary, the physical sciences are the most specialized and the humanities are the least specialized when it comes to the nine domains of knowledge. The impact of double majoring is felt most dramatically by science majors—who see huge gains in breadth when they add a dissimilar major (hypo) and huge losses when they add another science major (hyper). And while the social sciences don't appear to gain or lose much from adding a dissimilar major (hypo), they do experience considerable narrowing when students double down with two social science majors.

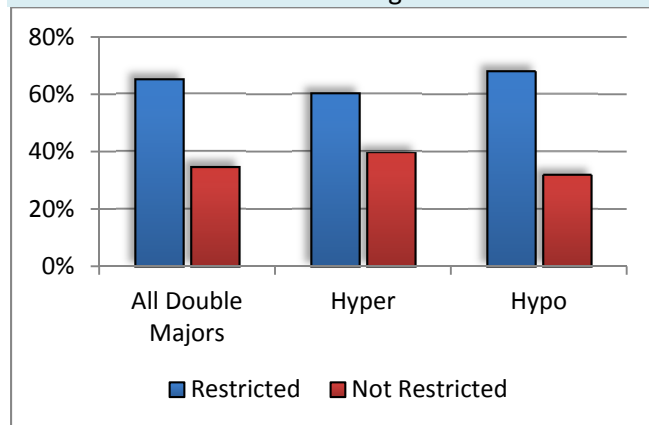
Previously we defined breadth through a measure of “concentration.” We acknowledge

there is more than one way to think about breadth—in addition to examining whether students are taking courses from many different domains of knowledge (i.e., concentration), breadth can also involve taking “electives” in pursuit of intellectual curiosities or passions. Finally, breadth might involve being deeply engaged in two different disciplines (rather than spreading oneself too thin by sampling across the curriculum). To what extent do students feel restricted by their double major combination?

In our survey we asked the students two related questions: first, “to what extent do you agree with the statement, ‘there are courses that I would love to take but cannot because of the requirements of my two majors’”; second, “what impact did choosing to double major have on opportunities to take electives that I am interested in.”

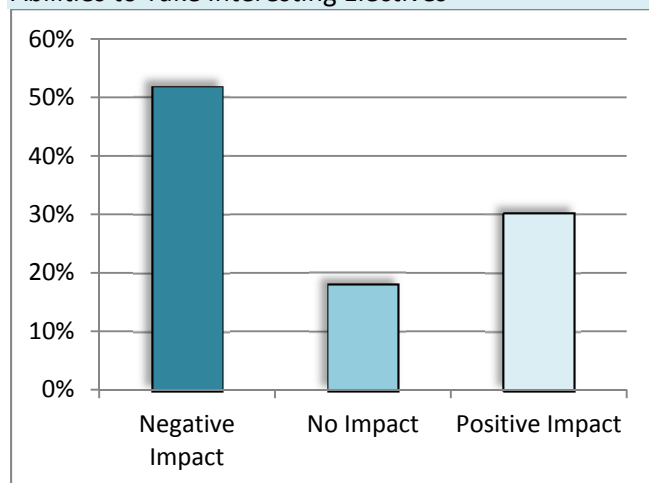
Charts 3.21 and 3.22 below show that most respondents feel restricted in their opportunities to take electives: 65% agree that they are restricted and 52% report that their double major limits opportunities to take electives. Still, sizeable minorities report that the double major either had no negative impact or had a positive impact (30%). In particular, when students select a humanities major as part of their combination there is a greater chance that they will say their double major combo *helped* them take electives they were interested in—33% compared to only 25% of those without a humanities major (figures not reported). Choosing to double major in the humanities seems to mitigate the negative impact of double majoring on electives; on the other hand, choosing to double down and hyper-specialize (both majors within the same disciplinary cluster) seems to mitigate the negative effect of the double major (sixty percent of respondents say they are restricted), while hypo-specializing (two majors in different disciplinary clusters) seems to exacerbate the problem.

Chart 3.21 Percentage of Students Who Feel Restricted in Their Course Taking



Hyper double majors often take more classes that count towards both majors, thereby freeing themselves to take classes outside of their majors. Hypo double majors, on the other hand, have fewer courses that can count toward *both* majors and, as a result, have to take more overall required courses, leaving less room to pursue interesting electives.

Chart 3.22 Impact of Double Majoring on Student Abilities to Take Interesting Electives



In focus groups, students echo these survey findings. Sarah (Education and Music) said her schedule as “been pretty much completely booked since freshman year.” Marie (Industrial Relations and French) remarked, “I think I have definitely been limited in my academic choices... I’ve never taken philosophy or sociology or anthropology; really, anything like

that. I don't think I realized it until this semester." Susie (Biology and Religion) compared herself to her friends who were taking "lots of liberal arts classes, cool classes in different areas... really exploring. And, I was already right on this track for my double major... I have definitely felt restricted." And Danielle (Psychology and Biology) agrees that she has felt restricted: "I don't have that freedom my senior year. You want to explore. You have spent three years doing all of this work, and working really hard to get your majors done and this year you kind of want to explore, take classes you really, really want to take. But, I haven't been able to do that because I am trying to finish a major."

Because of these limitations, students emphasize how important it is to choose majors that you really enjoy. Katie (English and Sociology) mentions, "I work with freshman as an academic advisor and the thing I tell them about double majoring is that it just limits your choices because you always have to take at least one class for one of your majors, and usually I have a lot of terms that I exclusively take classes for my two majors. So, you might not have time to take some other spontaneous classes; that is why it is really important to choose two things that you really, really like."

Breadth Within Constraint. While the majority of students feel restricted in taking elective courses by their double major, other students feel stretched or broadened by going deep in two different subject areas. Debbie (Art History and Linguistics) recalls looking in the course catalogue in her junior year and realizing that "all I wanted to take were art history and linguistics, which are my majors, and I guess that is a good thing because I chose the right majors. But I have focused more heavily on those and as a senior looking back there are a lot of things I could've taken that I would have also been interested in. But that being said, when you have two majors that aren't necessarily related, like mine, I feel like I

am getting a broad spectrum within the social sciences and humanities."

Danielle (Biology and Psychology), who noted above that she felt restricted in taking electives, also describes how her two majors together expand and broaden her learning: "My majors overlap with a lot of different stuff; like my psychology major forces me to do science-y stuff. I'm taking a class about primates and it is opening me up to that world."

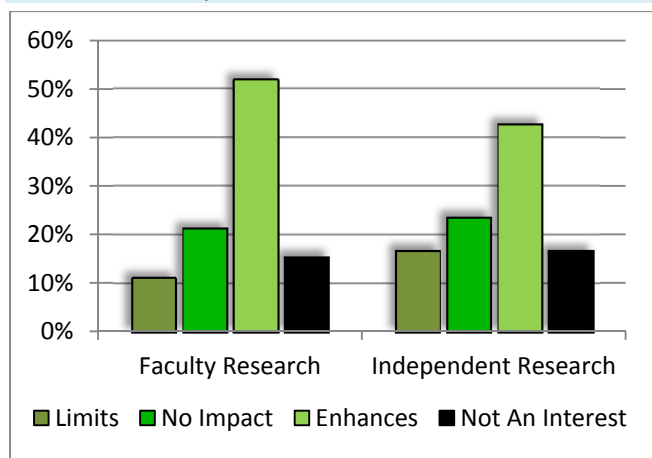
Liz (Anthropology and Music) felt that she was getting a broad education in part because the classes in her majors did a good job of exposing her to a broad set of ideas. Similarly, Laura (Spanish and Math) discusses how many departments allow you to fulfill upper-level requirements by taking cross-listed seminars in other departments: "I'm taking a class cross-listed with women's studies and theater. I took a class on performance art, which I can definitely say I never envisioned myself taking a class like that before I started college. And so I learned a lot about areas that I never felt I would have been interested in. I only took the class because it fulfilled my Spanish major. I've been exposed to so much and I feel like I appreciate so many things a lot more than I ever did before. And so I feel like I've really had the liberal arts education."

OTHER CURRICULAR EXPERIENCES

Independent and Faculty-Sponsored Research and Study. Based on Charts 3.23 and 3.24 below, there is strong evidence that double majors are more engaged in faculty-directed research than single majors, 46% compared to 40%. Not only do double majors report more involvement with faculty research, but they explicitly report that they think their double major combination enhanced their opportunities for research; 52% reported enhanced opportunities while only 11% perceive their double major as a barrier to

working with faculty on research. Similarly, 43% of double majors felt that they were more likely to do an independent study because of their double major, while only 16% felt that their double major limited their opportunities for independent study.

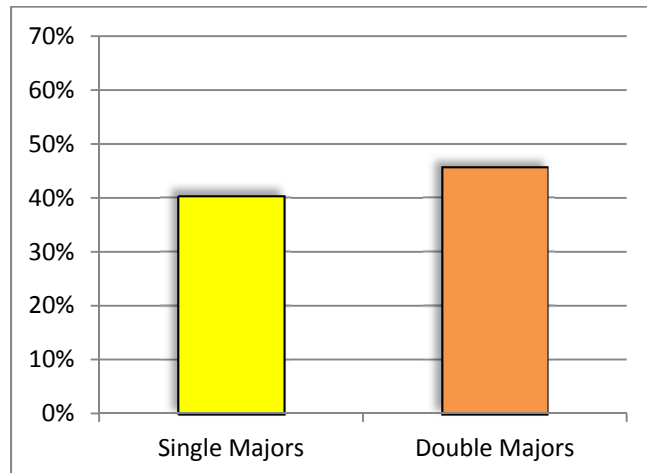
Chart 3.23 Student Perceptions of the Impact of Double Majoring on Ability to Complete Faculty-Directed or Independent Research



Double majoring likely leads to more faculty-directed research because some proportion of double majors—approximately ten percent—pick up a science major as their second major, and science majors are more likely than non-science majors to work with faculty on research. Double majors are also more likely to plan to go to graduate school (36% compared to 31%) and may participate in faculty research in part to be more competitive or to prepare themselves better for an advanced degree.

In terms of independent research (independent studies and honors theses), the double major may expand opportunities for several reasons. First, independent studies often arise from an established relationship between a faculty member and student. Double majoring produces more opportunities to establish meaningful relationships with faculty (more occasions to take multiple classes with the same faculty and access to more than one faculty advisor); this in turn could enhance opportunities for independent study

Chart 3.24 Percentage of Students Who Work on Research with Faculty



Finally, with many more requirements and the challenge of juggling tight class schedules, students may strategically take independent studies as a way to meet elective requirements in the most flexible way possible.

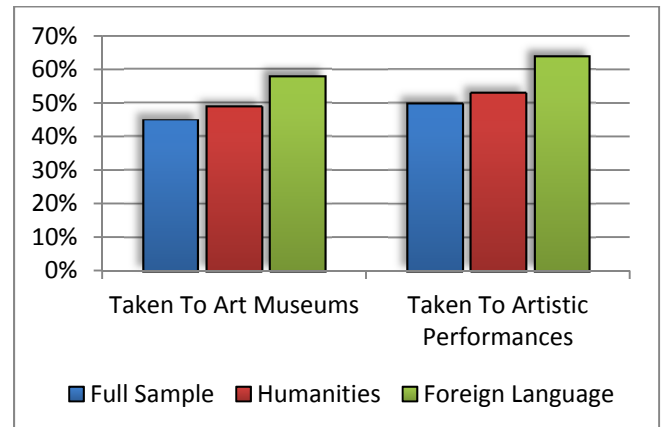
THE FOREIGN LANGUAGE DIVIDEND

In our study, the foreign language major is almost always paired with another major. Only eleven students chose to be a single major in a foreign language, while twenty times that number, or 228 students, chose a foreign language as part of a double major. The next most lopsided cluster in terms of the difference between the number of single and double majors is economics, where 34 students are single majors and slightly more than six times that many are double majors (191). More than any other major, foreign language is chosen almost exclusively with a second major. There would be few language majors were it not for the prevalence of the double major option. As Hannah (Business and Chinese) says, “Most Chinese majors are double majors. They don’t just do Chinese.”

Table 3.2 Percentage of Single and Double Majors Selecting Each Major Cluster (All Students)

Major Cluster	Single Major Total (N)	Single Major (%)	Double Major Total (N)	Double Major (%)	Difference (SM-DM)
Agriculture	10	2%	8	<1%	1%
Ethnic and Area Studies	33	5%	132	6%	-1%
Arts	69	11%	122	6%	5%
Biological Sciences	53	8%	132	6%	2%
Business and Econ	42	6%	141	7%	0%
Communications	19	3%	28	1%	2%
Education	14	2%	60	3%	-1%
Engineering	77	12%	104	5%	7%
Health Related	9	1%	11	1%	1%
Humanities	85	13%	333	15%	-2%
Foreign Language/ Lit	11	2%	228	11%	-9%
Physical Sciences	43	7%	188	9%	-2%
Social Sciences	187	29%	681	31%	-3%
Total	652	100%	2168	100%	

The link between double majoring and foreign language is apparent in Table 3.2, where we can see the percentage of each major cluster for both single and double majors. The difference score in the last column represents the degree to which the major benefits (e.g., having more total majors) from the presence of the double major option. Positive differences represent gains—humanities, physical sciences, economics, ethnic studies, education, and foreign language make up a greater percentage of the double major pool than the single major pool. Social sciences, engineering, arts, biological sciences, and communications, on the other hand, make up a greater proportion of single majors than double majors. Foreign language stands out for experiencing the greatest difference in proportion, representing less than two percent of all single majors (near the bottom) to a whopping eleven percent of double majors (third only to social sciences and humanities). Among the double majors, foreign language is a particularly popular combo with ethnic and area studies majors, biological sciences, business, communications and social sciences.

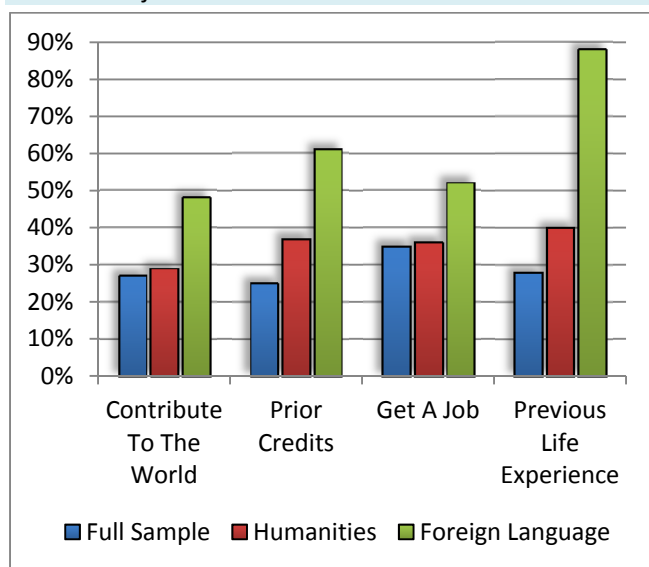
Chart 3.25 Comparing Cultural Capital Between The Full Sample of Double Majors, Humanities Majors, and Foreign Language Majors

How does the profile of the double major foreign language student differ from the rest of the sample? First, foreign language double majors are much more likely to be women—71% compared to 56% for the entire sample of double majors (64% for humanities double majors). Since foreign language is a subset of the humanities, we provide comparisons with the rest of the humanities majors in order to identify what is distinctly different about foreign language majors. Foreign language double majors are also more likely to have higher

levels of what we refer to as cultural capital: exposure to art and culture growing up (Chart 3.25).

Finally, students are motivated to choose a foreign language as a second major largely because of previous life experiences (88% chose this compared to 28% for the rest of the sample), followed by the fact that they already had foreign language credits from high school that they were able to build upon (61% chose this as a reason for choosing the major compared to 25% for the rest of the sample). Compared to the rest of the sample, they were also more likely to pick foreign language as their second major because it could help them get a job and contribute to the world (Chart 3.26).

Chart 3.26 Reasons Students Give For Selecting Second Major



Laura describes how she came to choose Spanish as a second major: “I studied abroad in Spain during high school and really liked that. So, I thought I would maybe minor in Spanish just to keep up with my Spanish. I decided to keep taking more classes and I loved every single one. So by my third class, I just decided to major in it.” And Erika (Spanish and Education) describes her previous life experience. “In high school, I

really loved Spanish. When I saw people who spoke Spanish, I would just want to talk to them. And in my senior year, I was the tutor in a third-grade classroom that was mostly Hispanic. I really loved it... teaching and speaking Spanish.” Hannah (Chinese and Business) got interested in languages because there were a lot of foreign exchange students in her high school. Marie says that she took French since the fifth-grade, and “I guess I always just assumed I would keep taking it. And, actually, one of my aunts lives in Paris and I always enjoyed visiting her and liked the language.”

Bob (Russian and Sociology) acknowledged that, “basically the reason why I chose Russian as a major was because I’d started studying Russian in high school. I just continued into college. There is no question that my previous experience in Russian led me to major in Russian.”

Brad (Spanish and Engineering) explicitly mentions the credits he had accumulated from high school: “I came in with twenty credit hours of Spanish. Then I tested out of one more class. I was able to start in the upper level Spanish classes. Without [the credit], a double degree would have been out of the question.” And Natasha (German and Economics) notes, “I came in here with credits. And studying abroad in Germany really helped out with my German credits. It was almost too easy.”

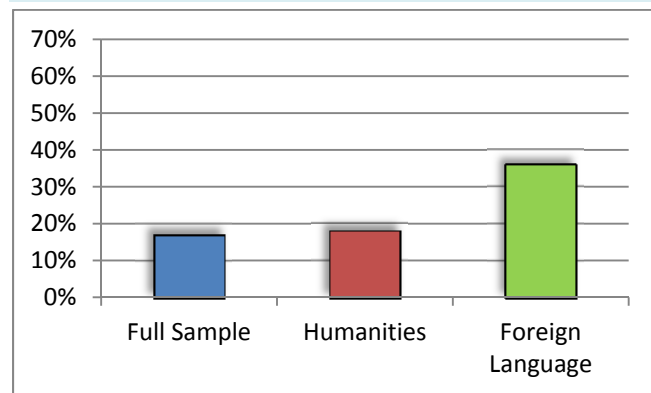
As noted above, foreign language double majors also see a very practical reason for majoring in a foreign language—it can help them get a job. This is true both for people who want to work internationally in business or politics, but also for those who are double majors in education and see their foreign language major as an important skill when teaching diverse kids. As Erika notes, “Whenever I have done classroom placements and I say I am a Spanish major, they just gush over you because there are no ESL programs. I

will go to classrooms and translate weekly newsletters, call parents who speak Spanish and tell them what happened in school today. So I feel really valuable as someone who can speak Spanish when I go into the classroom.”

Compared to other double major combinations, foreign language double majors show less integrative learning outcomes. Chart 3.27 shows that 34% of foreign language majors agree that there is “almost nothing I learned from one of my majors that is relevant to the other one”; this compares to 18% for the entire sample. Similarly, foreign language double majors are less likely to say that they are encouraged to apply and use knowledge across their two majors nor can they easily think of assignments that would draw on skills and knowledge gained in both of their majors. Pablo (Computer Science and Spanish) acknowledges the lack of integration: “I always see computer science and Spanish as pretty much opposed, completely opposite. One has nothing to do with the other, which is nice for me because I can take a break from one and jump back over to the other.” In spite of the lack of direct integration in the classroom, Pablo can still see important broader connections. “Computer programs mimic human speech. It’s this whole set of rules. And learning another language helps me understand these basic rules better.” Brad, the engineering student noted above, also says his foreign language skills are broadly relevant, even if not well integrated into classroom learning: “A lot of engineers hate writing papers, hate English, hate anything humanities related. So it helps me communicate ideas better, more clearly than most other engineers. I can put technical things in ways that other people can understand.” Hannah (Business and Chinese) agrees that there is little direct integration. “It’s not like my business or econ teachers will bring up specific things about the Chinese and U.S. markets.” Nevertheless, she thinks it is important for someone in business to understand cultural differences, a skill which

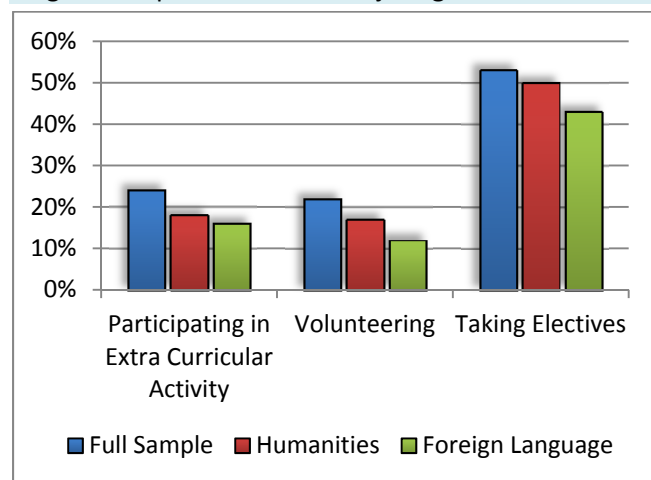
she attributes to her foreign language major. But, she has to make the connections independent of her coursework: “When it comes to tying them together, it is just me doing it on my own.”

Chart 3.27 Percentage Of Students Who Agree That There Is No Relevant Learning Across Two Majors



While there are fewer integrative learning outcomes for foreign language double majors, there are also fewer costs. Foreign language double majors are less likely to say their major combination negatively influenced their ability to participate in extracurricular activities, volunteering, or taking electives (see Chart 3.28).

Chart 3.28 Percentage Of Students Indicating a Negative Impact of Double Majoring on Activities

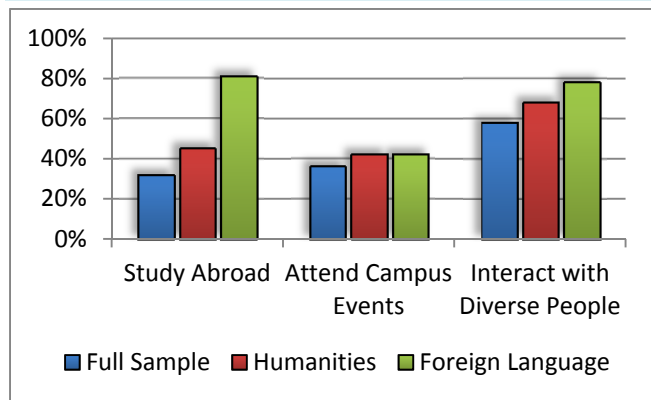


For some students this is because their foreign language major is less rigorous. Lucy (German and Biology) notes, “I knew that I wanted to do

German, but I also knew that at this college you are expected to have academic rigor, so why not go for two majors.” Here we see that Lucy saw her foreign language major as her easier major, one not rigorous enough to stand on its own.

On the other hand, foreign language double majors report huge benefits, as expected, in terms of their ability or opportunity to study abroad and significant benefits (compared to the rest of the double major sample) on opportunities to “interact with diverse people” (see Chart 3.29). Foreign language double majors are also more likely to say that their combination has helped them learn about different cultures. And, while we cannot claim that the foreign language double major combinations make students more tolerant, those double majors who end up in foreign languages are more likely to self-rate as tolerant, empathetic, and able to work cooperatively with diverse people.

Chart 3.29 Percentage Of Students Indicating a Positive Impact of Double Majoring on Activities

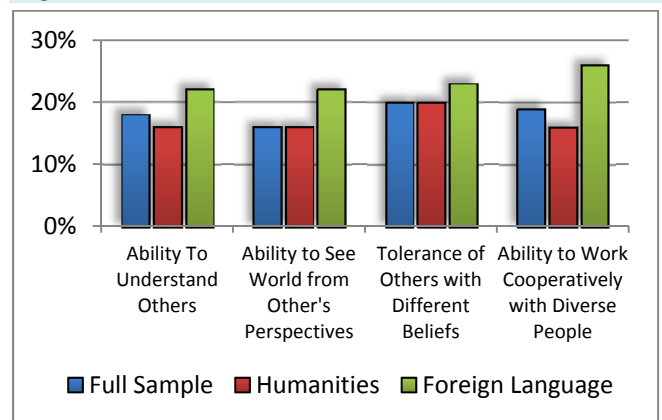


Take Elizabeth (Spanish and Education) for example. Here is how she explains the benefits of studying Spanish: “I took a course called culturally responsive teaching and we learned some about being aware of the culture and backgrounds of your students, and being sensitive to that and trying to make your classroom a community of different types of people. So I think that the Spanish major is a

natural fit for that. I studied abroad as well, so you learn about different cultures. And, Spanish being such a widely spoken language, there are a whole bunch of cultures encompassed in that. And so I've gotten a lot of experience dealing with people who are different from me, which I think is going to help me to be sensitive to that in my own classroom.”

In summary, foreign language double majors are extremely popular on college campuses. In fact, were it not for the opportunity to double major, there would be far fewer foreign language majors. Most students pick up the foreign language double major because it is convenient, they already have credits, and they have prior experience with their language of choice. It is a relatively easy addition to their schedules and they are able to add a foreign language major without sacrificing other things like extracurricular activities, taking electives, or volunteering. Not only is the foreign language major a natural and easy fit for many students, but it also fits well with their plans or desires to study abroad. A vast majority of foreign language double majors say their opportunity to study abroad was enhanced by their double major combination. This is partly because having a foreign language skill encourages them to study abroad and because they can apply their language credits earned while studying abroad to their major.

Chart 3.30 Percentage Of Students Rating Themselves Highest on Personal Skill Sets



In terms of liberal arts outcomes, the foreign language major does appear to be mainly an “add on,” rather than something that students are actively integrating into their overall course of study. Foreign language double majors see very little connection between their language courses and the courses in their other major. On the other hand, foreign language double majors report big gains in terms of exposure to other cultures and interactions with diverse people. Moreover, foreign language double majors are more open and tolerant of others and able to see the world from diverse perspectives. In sum, the foreign language double major seems to be a convenient and less demanding major that students “add” as their “extra” field of study. While it may not have huge creative payouts (in terms of integrative learning), it seems to yield extensive dividends in terms of exposure, diversity, and international exchange and understanding.

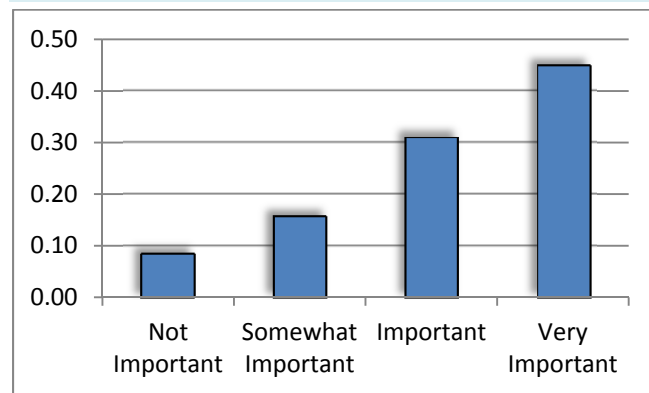
POST-BACCALAUREATE OUTCOMES

While it is important to understand the academic and extracurricular benefits of double majoring, higher education administrators are likely to be most interested in knowing if there are post-baccalaureate returns to choosing two majors.

Because post-baccalaureate outcomes of double majoring were not a primary focus of this study, we collected no data in either our survey or focus groups that would enable us to determine how double majoring affected our 1,800 respondents after graduation. Nonetheless, we do have data on what students hoped to do after graduation. We also have data from a different survey—the 2003 National Survey of College Graduates (NSCG)—which actually allows us to compare student choice of major(s) with job and graduate school outcomes (see Section V for more information about this survey).

Future Jobs. We asked double majors to tell us how important it was, when they were deciding to double major, that their major combination prepared them for future jobs. Their responses, which suggest some relationship between the major and the work they’d be doing in these jobs, show that having a major-to-job match was quite important for the majority of these students. Three-quarters of them describe this kind of match as important or very important.

Chart 3.31 Importance of Having Two Majors in Preparing Student for Future Employment



Using the NSCG sample, we find significant differences between single and double majors in the degree to which they believe their job is related to their major(s). Double majors are less likely to report that their job and major are related to each other (see Table 3.3).

Table 3.3 Relevance of Major to Employment

Majoring Profile	Mean	N
Single Majors	1.33	24123
Double Majors	1.27*	7044
• Hyper-specialists	1.33	3539
• Hypo-specialists	1.20*	3505

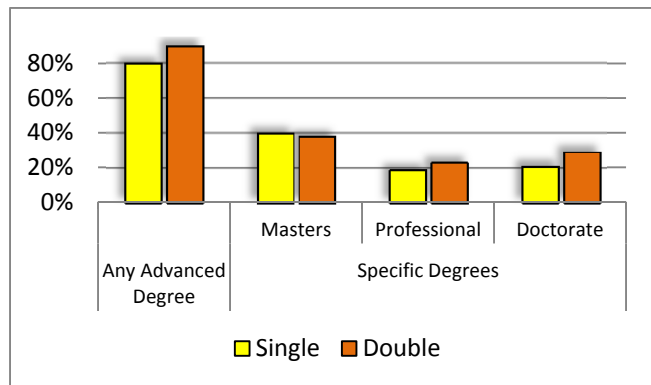
* Significantly different from single majors ($p < .05$)

While this is the case, when students *do* double major, there are differences in the impact of specialization. Hyper-specialists are more likely than hypo-specialists to report that their majors are related to the work they do in their occupations. These findings hold up for both

the entire sample and the sub-sample of recent graduates. These findings do not necessarily mean that choosing two dissimilar majors (broadening) leads to poorer employment outcomes. But, it does suggest, perhaps as expected, that students who are “spanners” in college are more likely to be “spanners” in the world of work as well—pursuing a range of jobs, many of which might only be tangentially related to their field of study.

Attainment of Advanced Degrees. Most students in our sample, whether single or double majors, planned to seek an advanced degree. As Chart 3.32 shows, eighty percent of single and ninety percent of double majors plan to complete some degree beyond their bachelor’s degree.

Chart 3.32 Students’ Post-Baccalaureate Aspirations



Using the NSCG sample, we find significant differences between single and double majors in regards to whether students receive degrees beyond the bachelor’s degree. Double majors are more likely than their peers to receive advanced degrees, generally, and more likely to receive each of three kinds—masters, professional, and doctoral—of degrees. About 43% of single majors receive advanced degrees while 47% of double majors do. These differences are retained when we control for the respondents’ age, gender, race, and parental education. They deepen if we only look at a sub-sample of recent (less than fifteen years out) graduates.

Table 3.4 Post-Baccalaureate Degree Attainment

Post-Baccalaureate Degree Attainment	Mean
Single Majors (any advanced degree)	
• Masters degrees (e.g., MS, MBA)	.29
• Professional degrees (e.g., MD, JD)	.05
• Doctoral degrees (e.g., PhD, EdD)	.09
Double Majors (any advanced degree)	
• Masters degrees (e.g., MS, MBA)	.32*
• Professional degrees (e.g., MD, JD)	.06*
• Doctoral degrees (e.g., PhD, EdD)	.10*

* Significantly different from comparison group (p<.05)

Annual Income. As we discussed in Section 2 of this report, ultimately, students choose their majors primarily on a belief that their choice—whether English or engineering—will reap some positive benefit after graduation. As indicated in section 2, between two and three percent of students selected “to make a lot of money” as their top choice for choosing their majors (whether first, second, or only major). Students do not report being primarily focused on financial gain when selecting their course of study. On the other hand, as Chart 3.34 shows, students still think earning a good salary is a relevant consideration with thinking about future career choices. About fifty percent of both single and double majors say that income potential is very important or essential when considering future jobs.

Much of the research on differences in major choice is based on this suspicion that students are making rational decisions about their futures. The consensus is that students believe the correct major(s) will signal the attainment of a body of knowledge that employers will value and pay for.

In addition to helping students get well-paying jobs, the double major might also provide students with the types of skills and knowledge that will actually help them succeed and advance in their careers. Ultimately, whether the major serves a signal of knowledge or a

source of it, the choice of one's major or majors is a function of students' beliefs about financial benefits they expect will accrue to them as a result of this choice. As indicated above, students downplay financial motivations when answering survey questions about their choice of major. Nonetheless, focus group interviews revealed that many students perceived their double major as giving them a competitive advantage in the job market and helping them earn a better living.

Chart 3.33 Importance of High Income Potential When Thinking About Career Paths



There are significant earnings differences between single and double majors, writ large. Double majors report lower annual earnings (of about \$866). This only drops to \$782 when we control for the respondents' age, gender, race, and parents' educations. We find this effect in the larger sample, but it is even larger for recent graduates. Recent graduates with two majors report nearly \$2,230 less than their peers who graduate with a single major. This imbalance is reduced to about \$1,300 when we control for some demographic characteristics. There are no significant earnings differences between hyper and hypo double majors. The reduction in salary occurs regardless of how students structure their two majors. This reduction is largely due to the fact that higher earning majors—science and engineering—are more likely to be single than double majors. Students in the STEM fields face greater time

constraints and less flexibility, reducing their opportunities to double major.

But, when we look at specific double major combinations (rather than aggregate differences between single and double majors) our findings corroborate previous studies that show that double majoring increases student earnings by 2.3 to 3.2% relative to having a single major. (Del Rossi and Hersch 2008). Because all double major combinations are not equal, we analyze salary data for different majors and combinations separately. We find that the benefits of having a second major are conditional on the choice of academic discipline(s).

In Table 3.5, we have listed the seven most common single major clusters with the average salaries of all full-time employed graduates without advanced degrees. We have then listed the top performing double major cluster combinations in terms of earning; each of these combinations earns more than the average for all full-time single majors without advanced degrees.

As one can see, certain majors (without a second major) carry a fairly high premium. Engineering and natural science (biological, physical, and quantitative) single majors tend to have higher annual incomes than their peers in other disciplines; along with business, these majors are all above-average in terms of earning potential. Those benefits are amplified when students couple these high-earning majors with each other. An engineering major can increase his or her salary more than 4% by adding a major such as chemistry to it. These premiums also exist if majors hyper-specialize, adding a second major located in the same disciplinary cluster as the first (e.g., finance and marketing); hyper-specializing engineering, natural science, and business majors can earn 2-3% more than their single majoring peers.

It is interesting to note that adding the arts, a mid-level single major in earnings, to semi-technical majors in the natural sciences brings the salaries of those majors up considerably (almost nine percent). With more than 400 respondents majoring in such combinations, this is likely a robust finding. Increasingly scholars and critics argue that creativity and innovation is enhanced when art and science are combined to solve problems and generate novel solutions. These initial findings suggest such added creativity might be rewarded in the form of higher earnings.

Similarly, advocates for the humanities have argued that the knowledge gained in English, history, languages, and philosophy can better prepare leaders and managers in any profession they find themselves. We often hear that business leaders or medical school admissions officers are looking for students who can think critically, see problems from multiple perspectives, and effectively communicate—all skills which are aligned with the humanities. Does our evidence bear this out? Are there advantages to coupling the humanities with other degrees? Does the market reward those who add a humanities degree as their second major? The results from Table 3.5 largely suggests the answer is “yes”—business, social science, and education majors all benefit from adding the humanities; only natural sciences see a small decline in earnings.

Table 3.5 Average Salary of Different High-Earning College Major Profiles (Bachelors’ Degree Only)

DM Cluster Combination	Salary	N
Single Majors (All, BA/BS only)	\$62165	24123
• <i>Engineering</i>	\$75063	5822
• <i>Natural Sciences</i>	\$66022	4141
• <i>Business</i>	\$62570	4750
• <i>Arts/Architecture</i>	\$53869	856
• <i>Social Science</i>	\$53498	2681
• <i>Humanities</i>	\$52512	1205
• <i>Education</i>	\$43129	1892
Double Majors (All, BA/BS only)	\$61299	7044
• <i>Engineering & Engineering</i>	\$77176	460
• <i>Engineering & Natural Science</i>	\$78342	250
• <i>Engineering & Business</i>	\$76256	94
• <i>Nat Science & Nat Science</i>	\$67831	799
• <i>Nat Science & Arts</i>	\$71790	426
• <i>Nat Science & Social Science</i>	\$66604	114
• <i>Business & Business</i>	\$64007	909
• <i>Business & Humanities</i>	\$64250	83
• <i>Business & Social Science</i>	\$63004	186
• <i>Social Science & Social Science</i>	\$51534	499
• <i>Social Science & Business</i>	\$61826	115
• <i>Social Science & Humanities</i>	\$56419	192
• <i>Humanities & Humanities</i>	\$56970	184
• <i>Humanities & Social Science</i>	\$51876	169
• <i>Humanities & Education</i>	\$48464	112
• <i>Education & Humanities</i>	\$48525	120
• <i>Education & Social Science</i>	\$45491	109

Section 4

Conclusions and Policy Recommendations

In a 2012 commercial for an AT&T telephone, an executive, sitting in a circle with five kids, asks, “What’s better—being able to shoot two lasers out of both of your eyes at one time, or one laser out of one eye?” The kids shout in unison, “Two!” “Why?” he asks. An animated boy responds, “It’s just more fun. One beam, ok, does a little bit of damage; two beams, it will make something explode.” Two lasers are always better than one. This is, in part, the mentality that motivates students when they decide to pursue two majors. Two is better than one. Many students believe two majors is a better return on their investment and most students believe it makes them more competitive for jobs and/or graduate school. Moreover, many students have mastered what it takes to juggle the demands of two majors and they often choose majors with overlapping requirements or in areas where they have already accumulated many credit hours. Most students report having to sacrifice little in order to double major—with minimal impact on extracurricular activities, elective courses, independent study, travel abroad, or honors research.

The hallmarks of a liberal education are exposure and depth. Students gain exposure through the general education curriculum where they sample from a variety of disciplines, methods and topics. They gain depth and mastery through their major where they take a sequence of courses that build on one another and provide students with a set of tools and perspectives to solve particular types of puzzles relevant to their area of specialization. In the foreword to this report, George D. Kuh suggests that in addition to exposure and depth, there is a third leg that supports a liberal education: integration. Critical and creative

thinking require an ability to make connections across domains of knowledge, classes, and subject matter. This type of integrative thinking is increasingly recognized as essential to solving complex twenty-first century problems like long-term poverty, global climate change, and public health challenges (Jacobs and Frickel 2009). As Jerry Jacobs argues, true integration and interdisciplinarity requires that both sides of the interdisciplinary collaboration bring significant expertise to the table. Integrative thinking and collaboration are not about dabbling and sampling (e.g., exposure); rather, they require the complex process of interweaving differing assumptions and approaches to asking questions, evaluating evidence, interpreting patterns, and communicating ideas. Whether this process involves collaboration between people or integration across domains by a single person, interdisciplinarity is aided when individuals bring a type of “bi-mastery” to the table.

Double majors hold out the promise of strengthening the third leg of the liberal arts stool. In theory, double majors are well positioned to be strong integrative and interdisciplinary thinkers and collaborators. They have mastered at least two different domains of knowledge and should, in principle, draw on both domains when working through puzzles that require creativity.

We went into the research with the assumption that it was the Renaissance student who majored in very different fields – like art and science – who would reap the biggest gains in terms of creativity and liberal learning. As it turns out, the vast majority of all double majors (even those who “double down” in very similar areas like finance and economics), report that

they are more creative because of their double major combination and, importantly, that they experience integrative learning. Most double majoring students feel that what they learn in one major is relevant to the other; they can think of assignments that would allow them to draw on skills and knowledge gained in both majors; and they have completed assignments that, with some reworking, would also be relevant to a class in the other major. Overall, double major students seem to have a good intellectual grasp of how to make connections across their fields of study. Nonetheless, students often complain that there are few institutional structures set up to explicitly require or encourage them to bring their two fields of study together.

One way in which students attempt to put integrative learning into practice is to write an honors thesis or do an independent study that allows them to bring together their different majors. For example, Evelyn (Economics and Philosophy) said she realized both fields look at the same problems from different perspectives. She chose to do an independent study examining legal problems and contracts in order to compare and contrast the approach of both of her majors.

But, this also poses challenges. One student, Michelle (English and Spanish) discusses the challenges of doing an independent paper that connects her two majors: “My advisors are in different departments. One will read it and write all of these comments. Then I’ll go to my next meeting, and she will have read it and it’s a whole different set of comments. And both are deadline oriented. Personally, it is a lot harder to keep up with both.” Claire (Art and Philosophy) feels that her majors are related conceptually, but “the departments make it difficult to combine them. Many art students drop their other major because the departments don’t compromise.” Steve (Economics and Political Science) said he was lucky with his independent study because his

advisors have a similar focus. But, he says, “It could have been a disaster. I could have been in deep trouble because many advisors are pretty stubborn in what they want to see.”

Marie (Industrial Relations and French) provides a specific example from her first meeting with her French advisor. She was trying to incorporate the Industrial Relations major into her independent study: “I told her that these are the variables I want to use and my French advisor was like, ‘we don’t do that.’ So you have to find a middle ground.” Henry (Philosophy and English) described his dilemma in writing an independent paper: “In the English department, it’s a lot of analysis and syntheses. It’s very source based and you get in trouble if you go too far away from your sources. And in the philosophy department, you are supposed to go beyond your sources...you should be doing your own philosophizing. So one of my advisers would tell me this needs to be more text based; than the other will say you’re not getting enough philosophy. It’s just two different worlds.” These examples suggest that faculty, even on campuses with multiple interdisciplinary departments, centers, and programs, are either incapable of seeing connections between and among their fields or are unwilling to let students experiment with integrating the disparate points of knowledge whose accumulation we champion when discussing the need for core curricula and liberal arts graduate degree requirements.

Finally, faculty can unintentionally make it difficult for double major students because they give students the impression that they disapprove of their second major. Students feel a competitive pressure between departments. Henry (English and Philosophy) feels like there is a strong sense of allegiance with each major and his professors are “paying attention to which side I’m really on.” And Grant (Philosophy and Computer Science) felt that he was “exiled” in the computer science department and that his computer science

advisor would make “little crude remarks about my philosophy major, like ‘oh well it’s because you’re a philosophy major and they do that.” Sara (Biology and Art History) also feels condescension from her science advisors who do not necessarily respect her choice of double majors: “Scientifically, I am just as capable as everyone else in the lab; but I am always the one given the more fluffy jobs in the lab. They don’t really know how to deal with me.”

So, while many students see significant and varied connections between their majors, these connections happen in spite of institutional policies and practices. The vast majority of colleges and universities have no formal way of helping students integrate their majors. Moreover, faculty and advisors are often subtly or openly hostile to the students’ second major. When students attempt to overcome the institutional barriers that separate their two fields of study by pursuing independent research, they often face resistance—faculty “stubbornly” demand disciplinary-specific approaches requiring students to creatively balance conflicting demands. For example, some students go outside of the curriculum in order to find ways to connect their two majors. Zadie (Biology and Creative Writing) figured out a way to integrate her two majors through her extracurricular work—editing magazines that had a science focus or working with the undergraduate research journal at her school.

In addition to integrative learning, the double major appears to offer many students an important way to connect their academic work to their core identity. In our focus groups, students discuss how their two majors often connect two different passions and talents. Many students pick second majors that they perceive as less prestigious or marketable but that allow them to pursue something about which they feel passionate. This is particularly true for students in the natural and life sciences who pick up an art, humanities, or social science major second.

Overall, we find support for the potential benefits of the double major. Of course, while some students are motivated to expand their horizons and integrate their coursework, others are more interested in simply adding another “feather” in their academic caps, another credential, without seeking much connection between their fields of study. Our recommendations below are aimed at expanding and enlarging the potential positive impact of the double major to more students across more disciplines.

Recommendation 1: Students who choose to double major could be required to explain their decision to their academic advisor and encouraged to reflect on how their two majors reinforce one another intellectually and practically. Such reflection might help students be better prepared to see connections when they arise in classes and assignments.

Recommendation 2: Institutions should proactively consider ways to help students integrate and synthesize across majors. Double majoring is one of the most important curricular “innovations” in the last few decades. But this change in curricula has been entirely “user-driven”; most schools have neither encouraged nor discouraged double majoring. Rather, they have stood off to the side while students make decisions that significantly affect their college experience.

Many students report that their double major combination helps them think differently, solve intellectual puzzles, and approach assignments more creatively (although focus group interviews show a more complex relationship to creativity). When students major in two disparate domains of knowledge, especially combining science with art and humanities, they are more likely to report creative thinking outcomes; whereas when they double major in more similar domains, they report more integrative learning. But much of this integration takes place indirectly and outside of

specific projects or course material. If they desire more thoughtful integrative learning, schools should consider supporting (and possibly requiring) senior capstone projects—theses or independent studies—that require students to integrate across disciplines. Such projects should be supervised jointly by faculty in each of the student’s home majors. Faculty should meet together early in the project with students to discuss how to meet the expectations of both disciplines.

Recommendation 3: In addition to a senior capstone or honors project, faculty across the university should be aware that a growing proportion of their students will have expertise in more than one domain of knowledge. Faculty should explicitly encourage students to provide the perspective of their other major. An English and History double major student might be asked in an American literature class to give the historical context in which Ralph Ellison wrote *Invisible Man*. In a studio art class, an art and chemistry double major might be asked to discuss the chemicals used in printmaking. Universities seek to promote the ideals of interdisciplinarity, even while we struggle to realize these ideals in practice. A largely invisible, but perhaps easily mined resource for interdisciplinarity, is our own students who are like bees buzzing around campus, landing on different majors and domains of knowledge and who could, with some prodding, cross-pollinate our classrooms.

Recommendation 4: If we want to encourage creativity, we should promote hypo (spanning) rather than hyper (specializing) double majors. In particular, universities should encourage their science students to consider a second major or minor in an art or humanities area. We make this suggestion for two reasons. First, on core creative skills (synthesizing across different areas; dealing with ambiguity, non-routine problem solving, risk-taking, curiosity, and creative expression), students report gains in their arts and humanities classes at rates 3 to

4 times higher than in the STEM fields. Adding arts and humanities courses will expose more science students to the type of creative learning that we say we value in a liberal arts education. Second, not only do science students gain valuable creativity skills and knowledge in their humanities and arts courses, but we find a “spill-over effect.” Science students report more creative outcomes in their science classes when they are simultaneously majoring in an art or humanities field. One way of encouraging hypo- rather than hyper-specialization is to make double counting courses more difficult for those in two similar fields—like business and accounting, or biology and chemistry. Similarly, perhaps some core requirements could be relaxed or made more flexible for those students who are attempting to bridge two very different, but perhaps equally demanding, majors.

Recommendation 5: If we want students to synthesize knowledge across majors, we need to prime them to *want* to achieve this outcome. In our research, we found that students who were motivated to double major because they wanted exposure to two very different subject areas that could complement one another were in fact better able to make connections across their two majors than students who were not similarly motivated. In other words, students should be more intentional about the possible benefits of double majoring and, perhaps, should be introduced to strategies and tactics early on (e.g., a workshop on interdisciplinarity in their sophomore or junior year) to help prepare them for the promise of their double major journey.

Recommendation 6: Related to the above observation, the benefits of double majoring—whether in terms of curricular advantages or post-baccalaureate outcomes—seem intimately related to the student’s own “story” for choosing two majors. Some students told more compelling narratives than others. For many students in our focus groups, they could not

articulate a strong reason for their choice of majors. Some noted that they “fell” into one major because they had accumulated enough credits; or they just liked the professors; or they just found the topic interesting. As we discussed in our section on status and prestige, many students play up one major while deemphasizing their second major. On the other hand, students like Caroline (French and Mathematics) was extremely articulate about her choice. For one, she clearly identifies with both subject areas and talked persuasively about how she was introduced to each, how her interests grew, and how her decision to double major was carefully considered and linked to her interests, skills, passions and goals. More importantly, Caroline could tell how the two majors together would help her become a better doctor. It is worth quoting her at length:

“I think it’s going to help me immensely in medicine when I get there. When I look at a patient, I never want to be thinking, ‘Oh, this is just like strictly analytical, so let’s figure out what’s wrong,’ and not be thinking, ‘this is a person and, like, what is her story.’ Cause all that is involved in what’s going on with this person with this disease or condition... you need two approaches to creativity – the more methodological and analytical type with math and the more humanistic side with French. I think that gives me a two-way attack on a problem with some of my patients. Both are important to me.”

We have seen that double majors are more likely to go to graduate school and are rewarded with slightly higher salaries in the job market. But, these benefits—getting into medical school or impressing a job recruiter—require the rhetorical ability to tell a compelling story about one’s educational pathway. Institutions could enlist their career services offices to help students write personal narratives about their choices of majors and how often seemingly different areas are actually

part of a single educational story that matches a student’s identity and aspirations.

Recommendation 7: Consider and mitigate the negative effects of the over-scheduled student. While most of our respondents indicated that they were up to the task of juggling the demands of two majors, many acknowledged the frantic lives they were living. Colleges and universities know that self-reported stress and anxiety levels have been rising for undergraduates over the past few decades (Gallagher 2008). And, in spite of recent findings that students are spending less time reading and preparing for class (Arum and Roksa 2011), other evidence suggests that students feel increasing pressures and have a harder and harder time balancing school, social life, volunteering, and extra-curricular activities (Lewin 2011; Tartakovsky 2008). The double major phenomenon adds to this already crowded and time-scarce student environment. Furthermore, our findings from our focus groups suggest this can, in some cases, have a negative consequence on the personal expression of creativity. Double majoring students, especially those in the arts, lament the loss of time to deeply reflect on their creative work and to revisit and revise their writing and their artistic productions. While double majors might generally feel more creative, true creative output requires deep immersion. The “do more, do more” life of the double major can work against such deep thinking.

The solutions for this problem are varied. One possibility is to create or encourage more six-credit courses. By reducing the number of different courses, while keeping credit hours constant, institutions can give students more opportunities for “deep dives” into areas that they are passionate about and that require more creative and often time-consuming analysis and reflection. “Maymesters” and January terms are also effective ways to achieve more focused learning and study.

Recommendation 8: Institutions should consider the relative advantages and disadvantages of the “minor” versus the “major.” Many of the students in our sample who chose not to double major selected a minor instead. Our research did not allow us to compare minors and double majors. But we suspect that the minor might be an excellent compromise for many students—giving them a chance to gain additional expertise in a different subject area while not imposing as many additional demands. Perhaps minors get just as much payout in terms of creativity and a liberal arts education as majors, but retain more flexibility for taking additional electives, studying abroad, writing an honors thesis or simply engaging their existing course material more deeply. And, to the extent that students are looking for a competitive edge when they choose to double major (or looking for a practical, job-related major to go along with a more expressive and interest-driven major), institutions should explore the benefits of academic certificates in varied interdisciplinary topics like entrepreneurship studies, visual design, food studies, health communication, or arts administration. Again, these certificate programs might give students a distinctive edge and expose them to interdisciplinary domains of knowledge while not imposing some of the constraining limitations that come with being a full blown double major.

While these recommendations are primarily aimed at policy makers and academic administrators, the findings in this report suggest that the social scientific study of higher education can benefit from further analysis of the impact of double majoring on important higher education outcomes. Whether analyzing gender and racial segregation in academic fields (Charles and Bradley 2002; Davies and Guppy 1997; Goyette and Mullen 2006; Jacobs 1995), academic fields’ impacts on academic and cognitive development (Arum and Roksa 2011; Charles, Fischer, Mooney, and Massey 2009; Flowers, Osterlind,

Pascarella, and Pierson 2001), or the impact of academic field on employment or graduate school (Johnson and Elder 2002; Mullen, Goyette, and Soares 2003; Roksa 2005; Useem 1989), virtually no higher education research published in the last two decades has accounted for the fact that many students graduate with at least two majors. One of our objectives is to provide a rationale for further study of this trend and to illustrate how an appreciation of this growing phenomena can translate into empirical inquiry about its impact. The rise of double majors is perhaps the most significant trend in the curricular lives of today’s students. Understanding this phenomena is critical to a comprehensive understanding of the impact of postsecondary institutions on their matriculates.

Section 5

Technical Notes and Methodology

We used a mixed-methods, multiple-dataset approach to analyze motivations, outcomes, and identities related to the growing trend toward multiple majors.

The Majors Matter Survey. We used a web-based survey as the principal tool to gather information from approximately 1,760 undergraduate students at nine colleges and universities: two large comprehensive public universities (the Ohio State University and the University of Texas), three large comprehensive private universities (Duke University, Emory University, and Vanderbilt University), two medium-sized private universities (Dartmouth College and Trinity University), and two small liberal arts colleges (Knox College and the College of Wooster). The survey, included in this section as Appendix 5.2, not only solicited demographic data and detailed information about students' academic choices (e.g., influences, aspirations, courses taken), but it also incorporated other instruments such as the Creative Achievement Questionnaire (CAQ), divergent thinking tasks, and the Creative Personality Scale (CPS) to determine the creative dispositions of students and the creative learning outcomes of curricular experiences.

In choosing the nine campuses, we were guided by practical and theoretical concerns. First, we sought institutional partners where either the research team or the Foundation has strong connections and established trust. This was important given the nature of the data we were collecting and the extra challenge of getting approval and cooperation from each institution. In addition, to ensure that our sample of double majors was large

enough, we needed to choose institutions where between 50 and 75 graduating seniors have double majors. We also considered the following criteria when choosing institutions: institutions that have programs in place that connect subject matter across disciplines (e.g., Knox College), institutions that have a school of fine arts or a strong reputation as an arts training institution (e.g., the University of Texas), institutions that admit a broad and diverse student body (e.g., the Ohio State University), and institutions that are invested in creativity as a key institutional goal (e.g., Dartmouth College).

The survey targeted students who were entering their seventh semester of college at each of the participating institutions. We recruited a random sample of single majors at each institution and the population of double majors. The random selection of single majors was the responsibility of the primary contact at each institution. They also provided the researchers with the full list of seventh semester students who have declared two majors.

We contracted with Indiana University Center for Survey Research to administer the survey portion of this study. Each research site provided a list of prospective participants to Indiana. These lists were gathered by our primary contacts at the corresponding institution according to the inclusion/exclusion criteria listed above. Indiana University then emailed the potential participants with an invitation and link to the survey. They contacted the students every three to four days, with up to a total of four additional follow-ups for non-respondents. The survey took students approximately thirty minutes to complete.

Once the surveys were completed, Indiana University provided us with the survey data, which was stripped of contact information (i.e. email addresses). Of the 4000 students invited to participate in the study, 1760 (44%) submitted complete and usable surveys. Sample characteristics from the survey data are included in this section as Appendix 5.1.

Focus Group Interviews. Additional data for this study was drawn from group interviews, or small structured discussions, conducted with groups of eight to twelve students at each of the participating institutions. The interview questions generated more subtle and textured information about students' experiences within their majors. These focus groups also helped uncover aspects of major choice and its impact on both curricular and extra-curricular experiences that are difficult to ascertain from a close-ended survey instrument. These interviews focused on patterns—recurrent themes, perceptions and incidents—that go beyond individual students and capture the analytical richness of their collective stories.

Indiana University provided the PIs the email addresses and majors for all students with a double major that completed the survey. This list was used to recruit, by email, each student in the focus groups. The focus groups were administered by the PIs and participating graduate students and ultimately included eighty students across the nine campuses. Each focus group took approximately ninety minutes. They took place within a private classroom and were tape recorded and transcribed. The protocol for each focus group is included in this section as Appendix 5.3.

Transcript Data. In order to understand the impact of double majoring on course taking patterns, we collected a sample of more than 250 undergraduate transcripts. The transcripts were used to gather educational histories for each subject. The sample was compiled from students who specialize in a single physical

science, humanities, or social science major. We also collected transcripts of double major combinations: two physical sciences, two social science, two humanities, physical science and social science, physical science and humanities, and social science and humanities. We also included engineering and business transcripts for a total of 240 transcripts. The transcripts were selected from a sample of applications to graduate programs at a single university, but the transcripts came from over 140 colleges and universities.

The two primary variables used in that analysis were the type of single/double major combinations and our measure of breadth among students' college course selection. We coded every course the student took by semester and categorized them into nine domain-of-knowledge (DoK) classifications: artistic expression (ARTS), literary criticism and composition (READ), historical consciousness (HIST), foreign language and culture (LANG), moral and philosophical reasoning (MORL), scientific inquiry (SCIE), quantitative literacy (MATH), social analysis (SOCS), and diversity and global studies (MIXD). While nearly all "professional" courses (e.g., engineering, finance) were appropriate for our domains of knowledge conceptualization, those courses that were explicitly practical in nature (e.g., student teaching) were coded into a miscellaneous (MISC) category. Three researchers worked together to code every transcript and any discrepancies were cross-checked using course descriptions from university websites for reliability.

In order to measure breadth among these domains of knowledge, we use the Herfindahl-Hirschman Index as our dependent variable. The Herfindahl-Hirschman Index (HHI), created by economists Orris C. Herfindahl and Albert O. Hirschman, is a measure of the concentration of firms in a given market often used by economic and business scholars applied in antitrust and competition law

(Rhoades 1993). To produce an HHI for domains of knowledge, we consider the market shares to be the number of courses taken in each domain divided by the total number of courses completed over the student's academic career. Let's take, for example, two students that have completed nine courses. Student A took all nine courses in scientific inquiry, resulting in a 1.0 HHI score. On the other hand, student B took one course in each of the nine domains, giving the student a 0.1 HHI score. In other words, student A was highly concentrated, whereas student B had total breadth. The higher the HHI, the more concentrated students' course selection is and the less breadth across the domains of knowledge she or he has. The relevant descriptive characteristics for this data are included here as Appendix 5.4.

National Surveys. In order to understand the institutional origins of and trending towards double majoring, we used the *Integrated Postsecondary Education Data System* (IPEDS), an annual census taken among American colleges and universities. This census is conducted each year by the National Center for Education Statistics (NCES) and includes every postsecondary institution participating in federal student aid programs under Title IV. By far the most comprehensive dataset on colleges and universities, IPEDS collects a broad range of data including institutional characteristics, enrollment and graduation rates, degrees conferred, and financial costs and student aid. More than 6,700 institutions complete the survey each year. This analysis only includes "core institutions." These are not-for-profit schools classified by Carnegie (2005) as baccalaureate, masters, doctoral, and research institutions. Specialized schools of art, business, theology, and engineering that are not affiliated with some other comprehensive postsecondary institution were excluded. Service schools and schools located in outlying areas (e.g., Guam, American Samoa, US Virgin Islands) were also excluded. Our sample, drawn from the 2009

survey, consists of the remaining 1462 institutions. Descriptive statistics for this data are included here as Appendix 5.5.

Because we only studied students in their seventh semester of the baccalaureate programs, we did not have any data on post-baccalaureate outcomes. In order to understand how double majoring might affect the students once they graduated, we used the *National Survey of College Graduates* (NSCG 2003). The National Science Foundation sampled over 100,000 college graduates who held a bachelor's or higher degree in any field as of April 2000. The survey collects a broad range of data pertaining to each respondent's demographic characteristics (e.g., age, marital status, race), educational history (e.g., field and level for each college degree), employment and labor force status (e.g., sector of employment, salary, job satisfaction). We constrained our sample to include only those graduates under the age of 66 who were working full time and had graduated from "core institutions" (see description above). Most of our analysis focused on those respondents who have only one bachelor's degree (but may have more than one major). These adjustments reduced the NSCG sample from 100,000 respondents to the 32,000 we used for our analysis; this number went up to 56,000 when we analyzed the impact of double majoring on advanced degree attainment because we also included those with post-baccalaureate degrees.

Appendix 5.1 Characteristics of Double Majors Sample

	Total Sample	Dartmouth College	Duke University	Emory University	Knox College	Ohio State University	College of Wooster	Trinity University	University of Texas	Vanderbilt University
	N=1736	N=162	N=274	N=127	N=58	N=399	N=43	N=164	N=95	N=441
DOUBLE MAJORS										
Sample	62%	51%	74%	59%	40%	58%	49%	45%	42%	81%
IPEDS		19%	22%	16%	28%	6%	NA	40%	NA	32%
GENDER										
Male	57%	52%	53%	54%	56%	56%	51%	60%	73%	61%
Female	43%	48%	47%	46%	44%	44%	49%	40%	27%	39%
RACE/ETHNICITY										
Anglo, White	70%	61%	56%	61%	72%	75%	84%	75%	62%	78%
Asian	15%	21%	29%	27%	12%	9%	9%	10%	15%	8%
Afro-American, Black	7%	4%	6%	6%	7%	9%	5%	2%	9%	8%
Latino, Hispanic	6%	6%	8%	4%	3%	5%	0%	9%	11%	5%
Other	4%	9%	3%	7%	5%	2%	2%	3%	5%	3%
CITIZENSHIP										
US Citizenship	97%	94%	95%	98%	95%	99%	93%	98%	100%	98%
English First Language	88%	80%	76%	81%	93%	94%	93%	92%	91%	92%
HIGH SCHOOL										
Public High School	72%	71%	77%	66%	78%	85%	65%	66%	96%	56%
More Than 12 AP Credits	25%	32%	46%	36%	9%	9%	7%	14%	33%	29%
COLLEGE										
GPA Of 3.5 Or Higher	54%	67%	60%	67%	52%	42%	63%	51%	65%	53%
Has A Minor	38%	27%	49%	15%	59%	39%	44%	49%	34%	34%
Plans Advanced Degree	87%	95%	92%	92%	93%	76%	86%	87%	73%	91%
FAMILY OF ORIGIN										
First Generation (No Parental BA)	14%	8%	7%	8%	21%	33%	12%	7%	19%	7%
High Cultural Capital	48%	44%	49%	55%	59%	35%	63%	53%	58%	50%
Family Pays 50%+ Expenses	49%	57%	60%	47%	40%	40%	42%	53%	49%	51%

Appendix 5.2 Majors Matter Survey

1. In what year were you born?

1	9		
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2. In what year did you first enter this college?

2	0		
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3. What is your sex? Male Female

4. Select one or more of the following choices to best describe your race.

- White / Anglo-American Asian / Asian-American American Indian or Alaskan Native
 Black / African-American Latino(a) / Hispanic Pacific Islander or Native Hawaiian

5. What is your U.S. citizenship status?

- U.S. Citizen Permanent Resident Foreign National

6. Was English the primary language spoken in your home growing up? Yes No

7. What kind of work does your mother normally do? That is, what is the job called (e.g., accountant, electrician, HS teacher)?

8. What kind of work does your father normally do? That is, what is the job called (e.g., accountant, electrician, HS teacher)?

9. Indicate your mother's and father's (or legal guardian's) highest level of education. **MARK ONE RESPONSE IN EACH COLUMN**

No.	Statements	Mother (or female guardian)	Father (or male guardian)
1.	Did not finish high school	<input type="checkbox"/>	<input type="checkbox"/>
2.	Graduated from high school or equivalent (GED)	<input type="checkbox"/>	<input type="checkbox"/>
3.	Graduated from a two-year school (e.g., vocational or community college)	<input type="checkbox"/>	<input type="checkbox"/>
4.	Graduated from college	<input type="checkbox"/>	<input type="checkbox"/>
5.	Completed a Master's degree or equivalent	<input type="checkbox"/>	<input type="checkbox"/>
6.	Completed a Ph.D., M.D., or other advanced professional degree	<input type="checkbox"/>	<input type="checkbox"/>
7.	Don't Know	<input type="checkbox"/>	<input type="checkbox"/>

10. MARK ONE RESPONSE ON EACH LINE. In the home when you were growing up, how often did your parents – or other adult members of the household—do the following?

No.	Statements	Never	Sporadically (Annually)	Occasionally (Monthly)	Often (Weekly)
1	Listen to classical music, opera, or jazz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Take you to art museums or galleries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Take you to plays, dance or classical music performances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Encourage you to read books not required for school or religious studies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Which term best describes your high school?

- Public high school Private, independent school Catholic school
 Military school Private, religious school Home school

12. How important were good grades to you in high school? Not important Important Very important

13. In a typical week, how many total hours did you spend (as a high school senior) on all school-sponsored extracurricular activities (sports, clubs, or other activities)? MARK ONE.

- None 10-14 hours per week
 Less than 1 hour per week 15-19 hours per week
 1-4 hours per week 20-24 hours per week
 5-9 hours per week 25 hours or more per week

14. Please specify the number of courses you have taken of each type and indicate if you've received college credit for the courses (or exams associated with the courses).

No.	Course Types	Number Of Courses Taken	College Credits Earned?
1.	Advanced Placement – Biology		<input type="checkbox"/>
2.	Advanced Placement – Calculus (AB/BC)		<input type="checkbox"/>
3.	Advanced Placement – Chemistry		<input type="checkbox"/>
4.	Advanced Placement – Language (e.g., French, German)		<input type="checkbox"/>
5.	Advanced Placement – Economics		<input type="checkbox"/>
6.	Advanced Placement – English (Language/Literature)		<input type="checkbox"/>
7.	Advanced Placement – History (European/US/World)		<input type="checkbox"/>
8.	Advanced Placement – Government (Comparative/US)		<input type="checkbox"/>
9.	Advanced Placement – Physics (B/C)		<input type="checkbox"/>
10.	Advanced Placement – Statistics		<input type="checkbox"/>
11.	Advanced Placement – Computer Science (A/AB)		<input type="checkbox"/>
12.	International Baccalaureate (IB)		<input type="checkbox"/>
13.	College Course Before Freshman Year		<input type="checkbox"/>
14.	CLEP Examinations		<input type="checkbox"/>
15.	Arts Classes (music, theatre, visual)		<input type="checkbox"/>
16.	Other: _____		<input type="checkbox"/>

15. What is your current enrollment status at this college?

Full-Time Student

Part-Time Student

16. How important is or was each of the following in choosing to attend your current college?

No	Statements	Not Important	Somewhat Important	Very Important	Essential
1.	Low cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Availability of specific courses or major	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Being able to apply pre-college/AP credits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	A good record for placing graduates in jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Strong reputation of the school's academic programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	The school was a good fit for my personality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Opportunity to attend the same school your parents attended	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Size of the school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Availability of financial aid, such as loans or scholarships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Active social life at the school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	The school's extra-curricular opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	The community (e.g., rural, urban, diverse) that surrounds the school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	My parents' desire for me to attend this specific school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	The school's athletic program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Opportunities to explore the liberal arts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Proximity to your family or your hometown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Other (describe):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Below is a list of majors combined into groups (sample majors are in parentheses). How much status or prestige would you give each group of majors? How much status or prestige do you think society, generally, gives them?

1 = *Very Little Status or Prestige*

2 = *Average Status or Prestige*

3 = *Lots Of Status or Prestige*

Major Cluster	My Viewpoint			Society's Viewpoint		
Agriculture (agriculture, ecology, forestry, parks and recreation)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Arts (fine arts, applied arts, music, drama, film and video)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Biological Sciences (biology, biochemistry, botany, environmental science, microbiology, zoology)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Business and Economics (accounting, finance, economics, business, management, marketing)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Communications (advertising, public relations, speech, journalism, television/radio broadcasting)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Education (elementary education, secondary education, special education, physical education)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Engineering (aerospace, civil, chemical, computer, electrical, industrial, mechanical)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Ethnic and Area Studies (women's studies, Hispanic studies, American studies, peace studies)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Foreign Language & Literature (French, Spanish, Chinese, Italian)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Health-Related Fields (nursing, physical therapy, health technology, NOT pre-med)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Humanities (classics, English, history, linguistics, philosophy, religion, theology)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Physical Sciences (astronomy, chemistry, geology, mathematics, physics)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Social Sciences (political science, psychology, sociology, anthropology)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Pre-Professional (pre-medicine, pre-law, pre-architecture)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

Fill in the table below by going down each column. If you only have ONE major, answer the GOLD column only; leave the GREEN column blank. If you have two majors, fill in the GOLD column for one major and the GREEN column for the other. Remember which color goes with which major as you will be answering more questions about each of these majors.

18. Major 1 Name Of Major _____	18. Major 2 Name Of Major _____
19. Is this major your first one (i.e., you didn't formally switch from something else)?	
<input type="checkbox"/> Yes <input type="checkbox"/> No The original was: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No The original was: _____
20. How many courses in this major did you take before declaring your major?	
<input type="checkbox"/> 0 to 2 <input type="checkbox"/> 3 to 5 <input type="checkbox"/> 6 or more	<input type="checkbox"/> 0 to 2 <input type="checkbox"/> 3 to 5 <input type="checkbox"/> 6 or more
21. Why did you choose this major? (Check all that apply)	
<input type="checkbox"/> A. I can earn the grades I want <input type="checkbox"/> B. It is generally considered a prestigious major <input type="checkbox"/> C. Graduates in this major make a lot of money <input type="checkbox"/> D. The major is likely to help me get the job I want <input type="checkbox"/> E. The requirements for the major are flexible <input type="checkbox"/> F. I already had a lot of courses/credits in this major <input type="checkbox"/> G. I had to be a major in order to enroll in courses I wanted to take. <input type="checkbox"/> H. It fits my other major as a package deal <input type="checkbox"/> I. This major best represents who I really am <input type="checkbox"/> J. I find the subject interesting <input type="checkbox"/> K. Previous life experiences (e.g., travel, jobs) led to the choice <input type="checkbox"/> L. To make an important contribution to the world <input type="checkbox"/> M. I know and like professors in the department(s) <input type="checkbox"/> N. Several of my friends are majoring in this subject <input type="checkbox"/> O. My parents strongly urged me to declare this major <input type="checkbox"/> P. Other (describe): _____	<input type="checkbox"/> A. I can earn the grades I want <input type="checkbox"/> B. It is generally considered a prestigious major <input type="checkbox"/> C. Graduates in this major make a lot of money <input type="checkbox"/> D. The major is likely to help me get the job I want <input type="checkbox"/> E. The requirements for the major are flexible <input type="checkbox"/> F. I already had a lot of courses/credits in this major <input type="checkbox"/> G. I had to be a major in order to enroll in courses I wanted to take. <input type="checkbox"/> H. It fits my other major as a package deal <input type="checkbox"/> I. This major best represents who I really am <input type="checkbox"/> J. I find the subject interesting <input type="checkbox"/> K. Previous life experiences (e.g., travel, jobs) led to the choice <input type="checkbox"/> L. To make an important contribution to the world <input type="checkbox"/> M. I know and like professors in the department(s) <input type="checkbox"/> N. Several of my friends are majoring in this subject <input type="checkbox"/> O. My parents strongly urged me to declare this major <input type="checkbox"/> P. Other (describe): _____
21a. Of those reasons you chose, rank the top three reasons. Place the appropriate letter from above in the boxes below.	
Reason #1 _____ Reason #2 _____ Reason #3 _____	Reason #1 _____ Reason #2 _____ Reason #3 _____

22. When did you declare this major? (check one for each major)

<p>Freshman Year <input type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer</p> <p>Sophomore Year <input type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer</p> <p>Junior Year <input type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer</p> <p>Senior Year <input type="checkbox"/> Fall</p>	<p>Freshman Year <input type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer</p> <p>Sophomore Year <input type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer</p> <p>Junior Year <input type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer</p> <p>Senior Year <input type="checkbox"/> Fall</p>
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23. To what degree are you satisfied with this major?

<p><input type="checkbox"/> Not at all satisfied</p> <p><input type="checkbox"/> Somewhat satisfied</p> <p><input type="checkbox"/> Very satisfied</p>	<p><input type="checkbox"/> Not at all satisfied</p> <p><input type="checkbox"/> Somewhat satisfied</p> <p><input type="checkbox"/> Very satisfied</p>
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24. Whose advice did you seek when choosing this major (mark all that apply)?

<p><input type="checkbox"/> Pre-major advisor</p> <p><input type="checkbox"/> An advisor in the major</p> <p><input type="checkbox"/> One of my professors in that major</p> <p><input type="checkbox"/> Parents</p> <p><input type="checkbox"/> Friend(s)</p> <p><input type="checkbox"/> High school counselor</p> <p><input type="checkbox"/> College publications (e.g., catalog) or website</p> <p><input type="checkbox"/> None of the above</p>	<p><input type="checkbox"/> Pre-major advisor</p> <p><input type="checkbox"/> An advisor in the major</p> <p><input type="checkbox"/> One of my professors in that major</p> <p><input type="checkbox"/> Parents</p> <p><input type="checkbox"/> Friend(s)</p> <p><input type="checkbox"/> High school counselor</p> <p><input type="checkbox"/> College publications (e.g., catalog) or website</p> <p><input type="checkbox"/> None of the above</p>
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25. To what extent do you agree with the following statements about **major 1? When answering this question, remember to think only about the courses in this particular major. Think about the typical course in your major when answering this question.**

No.	Statements	Answers					
		Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1.	Assignments or exam questions are often ambiguous (i.e., you can take the assignment in multiple directions)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
2.	Final papers or assignments often look very different from what I initially proposed	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
3.	Assignments often allow me to make connections across multiple course units and/or readings	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
4.	Coursework often forces me to reevaluate something that I thought to be true	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
5.	Teachers usually require us to find the "right" answer	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
6.	There are often a lot of non-majors in my major's courses	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
7.	Coursework often allows me to express my individual creativity	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
8.	Coursework often requires me to learn by reasoning and using abstract principles	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
9.	Coursework and assignments often allow me to pursue things I am curious about	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
10.	Coursework often requires me to generate lots of new ideas and to brainstorm	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
11.	Courses often require me to build upon knowledge gained in other courses in the major.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
12.	I have been able to put together ideas or concepts from other courses when completing assignments or during class discussions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
13.	Coursework usually offer few absolute truths; there are multiple ways to look at a problem	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
14.	Classes often leave me wanting to know more about a subject by considering outside sources and independent reading	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
15.	Classes are often fun and intellectually playful	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
16.	Coursework often requires me to put myself in someone else's shoes or consider someone else's perspective	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
17.	Coursework often allows me to take risks in my assignments (e.g., to explore without fear of being judged)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
18.	Coursework often allows me to show initiative in shaping my assignments, to independently figure out what to work on	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
19.	Coursework often exposes me to ideas and values that are different from mine	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
20.	I often find myself discussing ideas from classes with friends, family members, co-workers	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

25a. To what extent do you agree with the following statements about **major 2? When answering this question, remember to think only about the courses in this particular major. Think about the typical course in your major when answering this question.**

No	Statements	Answers					
		Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1.	Assignments or exam questions are often ambiguous (i.e., you can take the assignment in multiple directions)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
2.	Final papers or assignments often look very different from what I initially proposed	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
3.	Assignments often allow me to make connections across multiple course units and/or readings	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
4.	Coursework often forces me to reevaluate something that I thought to be true	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
5.	Teachers usually require us to find the "right" answer	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
6.	There are often a lot of non-majors in my major's courses	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
7.	Coursework often allows me to express my individual creativity	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
8.	Coursework often requires me to learn by reasoning and using abstract principles	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
9.	Coursework and assignments often allow me to pursue things I'm curious about	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
10.	Coursework often requires me to generate lots of new ideas and to brainstorm	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
11.	Courses often require me to build upon knowledge gained in other courses in the major.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
12.	I have been able to put together ideas or concepts from other courses when completing assignments or during class discussions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
13.	Coursework usually offer few absolute truths; there are multiple ways to look at a problem	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
14.	Classes often leave me wanting to know more about a subject by considering outside sources and independent reading	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
15.	Classes are often fun and intellectually playful	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
16.	Coursework often requires me to put myself in someone else's shoes or consider someone else's perspective	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
17.	Coursework often allows me to take risks in my assignments (e.g., to explore without fear of being judged)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
18.	Coursework often allows me to show initiative in shaping my assignments, to independently figure out what to work on	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
19.	Coursework often exposes me to ideas and values that are different from mine	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
20.	I often find myself discussing ideas from classes with friends, family members, co-workers	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

26. For the next five questions, mark on the scale below how likely you are to focus on one major or the other in different settings. If equally, mark "Equal".

When you describe yourself to friends and peers your age											
MAJOR 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Equally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAJOR 2
When you talk to your parents about school or school work											
MAJOR 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Equally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAJOR 2
When you (currently/eventually) describe your college experience to future employers											
MAJOR 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Equally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAJOR 2
When thinking about your yourself and your identity											
MAJOR 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Equally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAJOR 2
When you think about your future (year after graduation)											
MAJOR 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Equally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAJOR 2

27. In deciding to double major, how important were the following factors? (Mark one response on each line)

No.	Statements	Not Important	Somewhat Important	Very Important	Essential
1.	Gaining a breadth of knowledge and experience across two very different subject areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Getting exposure to two subject areas that complement and reinforce one another in terms of skills and knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Having one major that is practical and one that is just fun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Taking advantage of all of the credits I had accumulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Having a reason to stay my entire senior year rather than graduate early	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Graduating with two majors makes me more competitive when applying to graduate school or jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Graduating with two majors prepares me better for the type of work I want to do in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Having two majors that together reflect who I am	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Graduating with two majors is a better value for the cost of a college degree here	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Any other reasons?				

28. To what degree do you agree with the following statements about your majors?

No.	Statements	Answers					
		Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree
1.	There is almost nothing I have learned from one of my majors that is relevant in the other one	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
2.	I think about things differently because of my double major combination	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
3.	My teachers encourage me to apply and use knowledge across my two majors	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
4.	I am more creative because of my double major	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
5.	There are courses that I would love to take but cannot because of the requirements of my two majors	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
6.	I can easily think of an assignment that would allow me to draw on skills or knowledge gained in both of my majors	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
7.	I have completed an assignment for one of my major's classes that, with some reworking, would also be relevant to a class in the other major	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

29. What impact did choosing to double major have on the following college experiences for you? If the experience listed is not something you are interested in, mark "not an interest."

	Opportunities to . . .	It has no effect at all	It limits my opportunities	It expands my opportunities	Not an interest
1.	Participate in extracurricular clubs or sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Do community service or volunteer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Work on a research project with our faculty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Study outside of the country	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Take electives that I am interested in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Attend campus events (e.g., talks, concerts)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Interact with people who are different from me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Spend time with my friends or family members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Complete an independent study or honors project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Please check all of the adjectives that best describe yourself.

- | | | | | | |
|--|---|---------------------------------------|---|---------------------------------------|---|
| <input type="checkbox"/> Capable | <input type="checkbox"/> Honest | <input type="checkbox"/> Artificial | <input type="checkbox"/> Intelligent | <input type="checkbox"/> Clever | <input type="checkbox"/> Well-mannered |
| <input type="checkbox"/> Cautious | <input type="checkbox"/> Few Interests | <input type="checkbox"/> Confident | <input type="checkbox"/> Inventive | <input type="checkbox"/> Egotistical | <input type="checkbox"/> Original |
| <input type="checkbox"/> Commonplace | <input type="checkbox"/> Self-Confident | <input type="checkbox"/> Humorous | <input type="checkbox"/> Reflective | <input type="checkbox"/> Conservative | <input type="checkbox"/> Sincere |
| <input type="checkbox"/> Individualistic | <input type="checkbox"/> Resourceful | <input type="checkbox"/> Conventional | <input type="checkbox"/> Many Interests | <input type="checkbox"/> Informal | <input type="checkbox"/> Sexy |
| <input type="checkbox"/> Dissatisfied | <input type="checkbox"/> Submissive | <input type="checkbox"/> Insightful | <input type="checkbox"/> Snobbish | <input type="checkbox"/> Suspicious | <input type="checkbox"/> Unconventional |

31. Using the scale below, rate yourself on each of the following skill sets, indicating whether that skill is a weakness of yours or a strength. We want the most accurate estimate of how you see yourself.

No.	Statements	Weak 1	2	3	4	5	6	Strong 7
1.	Academic ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Artistic ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Creativity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Drive to achieve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Emotional health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Leadership ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Mathematical ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Understanding of others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Public speaking ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Writing ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Ability to see the world from another perspective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Tolerance of others with different beliefs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Openness to having my own views changed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Ability to discuss and negotiate controversial issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Ability to work cooperatively with diverse people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Friendliness and social skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

32. Have you participated in the following school-sponsored activities in your freshman, sophomore or junior year in college? (Mark one response on each line)

No.	Statements	Did not participate	Participated	Participated as an officer or captain
1.	Band, orchestra, chorus, choir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	School play or musical	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Student government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Fraternity or sorority	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	School yearbook, newspaper, literary magazine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Service club (such as Key Club, Big Brothers or Big Sisters)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Academic club (e.g., French Club, Math Club)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Hobby club (such as photography, chess)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Religious club	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Racial, ethnic or other identity (e.g., GLB) club	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Intramural sports (competition between teams in your school)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Interscholastic sports (competition with other schools' teams)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Alternative Fall, Winter, or Spring Break	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

33. For the following items, indicate the frequency with which you engaged in each activity in your most recent year of college. Consider only those activities that were NOT required as part of your coursework.

Activity	Last Year				
	Never	Sporadically	Occasionally	Weekly	Daily
1. Played a musical instrument	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2. Developed a scientific experiment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3. Composed original music or choreographed a dance	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4. Wrote poetry, fiction, short stories or song lyrics	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5. Made films, videos or artistic photographs	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
6. Came up with and worked on a new business idea (e.g., wrote a plan)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7. Participated in dramatic arts or theater (as actor, technician, director)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8. Painted, drew a picture, or made sculpture	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9. Created a PowerPoint or poster presentation (not for class)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10. Made or designed clothing, costumes, etc.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11. Made a craft such as jewelry, decorations, greeting cards, pottery,	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12. Performed modern or traditional dance	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
13. Worked with a faculty member on a research project	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
14. Designed or substantially redesigned a web site	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
15. Wrote an original computer program (excluding school work)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
16. Remixed content I found online into my own creation	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
17. Invented something like a machine, tool, game, or other device	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
18. Create your own recipe or prepare food in novel way	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
19. Went to an art exhibit, play, dance, or other theater performance	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
20. Participated in religious activity (worship, meditation, prayer, etc.)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
21. Exercised or participated in physical fitness activities	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
22. Went to a lecture or panel discussion (not required for class)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
23. Participated in political demonstrations	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

34. The following statements reflect some abilities, skills, and attitudes that may be developed during a bachelor's degree program. In the first column, check how important each aspect is to you. In the last column, check how much you believe that ability is enhanced by your having this PARTICULAR combination of majors. In other words, do you enhance this skill more by having two majors than with either major alone?

Importance to Me				Statements	Ability Enhanced by Having This Combination of Majors			
Not Important	Somewhat Important	Important	Very Important		Not Enhanced	Somewhat Enhanced	Enhanced	Greatly Enhanced
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Thinking analytically and logically	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Expressing myself & my ideas in writing	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Thinking creatively	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Understanding different philosophies and cultures	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Bridging theory and practice	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Understanding myself—my abilities, interests, and limitations	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Working effectively as a team member or in groups	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Developing intellectual curiosity	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Expanding awareness of economic, political and social issues	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Being able to solve quantitative problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Placing current problems in historical perspective	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Increasing my understanding of art, literature, and other cultural aspects of society	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Expressing my own views and opinions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Developing my leadership skills	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Examining the strengths and weaknesses of my own views on topics or issues	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Understanding people of other racial and ethnic backgrounds	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	Acquiring job or work-related knowledge and skills	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

35. How many credit hours are you taking this term?

36. Do you have a minor? Yes No

If yes, please specify the name, and separate multiple minors with commas:

37. What is your overall grade average as of your most recently completed academic term? (Round up to the closest choice)

38. How do you meet your college expenses? Fill in the response that best approximates the amount of support from each of the various sources.

No.	Contributors	None	Very Little	Less Than Half	About Half	More Than Half	All or Nearly All
1.	Self (job, savings, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Spouse or partner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Employer support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Scholarships and grants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Loans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Other sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. Please indicate the highest degree you plan to complete eventually (at any institution)?

- None
- Bachelors (BA, BS, etc)
- Masters (MA, MS, MBA)
- Doctorate (PhD, EdD)
- Doctorate (MD, DO, DVM)
- Law Degree (LLB, JD)

Other (Please Describe)

40. When thinking about your career path after college, how important are the following considerations? MARK ONE RESPONSE ON EACH LINE

No.	Statements	Not Important	Somewhat Important	Very Important	Essential
1.	Working for social and/or community change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	High income potential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Social recognition or status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Stable, secure future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Work that allows me to be creative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Expression of personal values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Availability of jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	A healthy balance between work and leisure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Leadership potential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	A job that does not compete with quality family time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Being entrepreneurial and independent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Having early and consistent job advancement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

41. What do you plan to be doing in Fall 2010 (that's next year)? (Mark all that apply)

- | | |
|---|--|
| <input type="checkbox"/> Attending undergraduate college | <input type="checkbox"/> Attending graduate/professional school |
| <input type="checkbox"/> Working in a science/math related job | <input type="checkbox"/> Working in a social service related job |
| <input type="checkbox"/> Working in a business related job | <input type="checkbox"/> Working in a teaching related job |
| <input type="checkbox"/> Working in an arts related job | <input type="checkbox"/> Serving in the military |
| <input type="checkbox"/> Participating in community service | <input type="checkbox"/> Taking some time off to "find myself" |
| <input type="checkbox"/> Staying at home to be with or start a family | <input type="checkbox"/> No current plans |
| <input type="checkbox"/> Other (describe): | |

42. For the following statements, please indicate the extent to which you agree or disagree with the statement.

	Statements	Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree
1.	It sometimes bothers me quite a bit that I can't afford to buy all the things I'd like	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	I have all the material possessions I really need to enjoy life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	My life would be better if I owned certain things I don't have	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Buying things gives me a lot of pleasure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	I believe students should think of their education as a product they are buying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Students should get tuition and fee reimbursement for classes they think they didn't learn anything from	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 5.3 Double Majors Project Focus Group Protocol

At the start of each focus group, have the students sit around the conference table with the moderator at the front. The note-taker will be positioned in a chair apart from the table, preferably in a location that would not distract any of the respondents. Each student will be asked to fill out a name-card with a pseudonym as the first step towards maintaining respondent anonymity.

Give each student a copy of the consent form and ask them to read the form. Review each section and check for comprehension. Specifically inform students that although we ask that participants not repeat anything that they have heard in the group discussion, it is possible that they may repeat something said to someone outside the group, resulting in a breach of confidentiality. Ask each participant to agree, verbally, that they will “respect each other’s privacy and anonymity by not revealing the identities of other participants nor indicate who made specific comments during the discussion.” If all students agree to continue in the focus group, have them sign the consent form.

Once consent forms are signed, ask each student to introduce him- or herself with their pseudonym and their two majors. Facilitate discussion around the answers to the following questions. If one or more students are dominating the meeting, directly call on others. For those questions marked with a superscript “R”, use a round-table approach, giving each person a moment to answer the question.

- Q1^R. What effect, if any, did your high school experience have on your choice to major in these two disciplines? Feel free to talk about courses, extracurricular activities, etc.
- Q2^R. Why did you choose your majors? Which did you choose first?
- Q3. To what degree do you feel that your majors go together? Do any of you have specific examples of ways you’ve integrated the two majors?
- Q4. Are there ways that people treat you like one of your majors? Do people treat you like one more than the other? What do you think causes that kind of treatment?
- Q5. How does space—the distance between buildings, the way your majors’ buildings/classrooms are designed and furnished, the people who “reside” in those spaces—factor into your experience as a double major?
- Q6. What are some ways that one or both of your majors affects how you live your life once you’ve left the classroom?
- Q7. Do you feel that being a double major increases or decreases your control over your academic program? Why do you feel that way?
- Q8. How would you describe a “creative person”? What impact, if any, do you believe being a double major has on your creativity? Is that impact a function of the combination of majors or simply being something called a double-major?
- Q9^R. How do people that matter to you respond when you tell them you have your combination of majors?
- Q10. While your major could be just a set of courses you take, it is also possible that your major could define you. For example, I took courses in sociology, but I also think of myself as a “sociologist.” Do any of you have that same sense of major-identity? Is that sense related to both majors or only one? Why do you believe that is your answer?
- Q11. If you could start over again, would you have chosen these two majors? Would you have dropped one or both? Would you have switched the order of when you declared the major?
- Q12. Talk about what you believe you’ve gained by having two majors. Think of your situation relative to your friends/peers who are in only one of the majors, i.e., choose ONE of your two majors and start your sentence with something like, “Compared to my friend(s) who are only _____ majors, I have gained”
- Q13. Do you have a minor? How does your minor fit into your overall academic plan? Why is it only a minor? Did one of your majors start, in your plan/mind, as only a “minor” interest?
- Q14. What are your post-baccalaureate plans? How does being a double-major affect those plans? How did/do these plans affect your choice to double-major?
- Q15^R. What effect do you believe being a double-major will have when future employers or graduate/professional school admissions committees discover your status?

Appendix 5.4 Descriptive Statistics for Transcript Data

	A. Total Sample	B. Single Majors	C. Double Majors
	Mean/ Percent	Mean/ Percent	Mean/ Percent
<i>Student Characteristics</i>			
Female (1=Yes)	63.50%	54.44%	70.91%
Minor (1=Yes)	22.00%	30.00%	15.45%
Study Abroad (1=Yes)	24.50%	18.89%	29.09%
Institution Tuition (Average)	\$22,403	\$22,192	\$20,752
<i>Student Achievement</i>			
Grade Point Average	3.57	3.55	3.60
Composite GRE Score (of 1600)	1279.65	1278.44	1280.64
Verbal (of 800)	592.30	588.33	595.55
Quantitative (of 800)	687.35	690.11	685.09
<i>Course Characteristics</i>			
Total Courses	37.61	36.38	38.61
Total Pre-College Courses	3.89	2.96	4.66
Humanities	1.78	1.22	2.23
Social Science	.48	.50	.46
Physical Science	1.45	.99	1.82
<i>Herfindahl-Hirschman Index</i>	.29	.28	.30
<i>Number of Cases</i>	200	90	110

Appendix 5.5 Descriptive Statistics for Integrated Postsecondary Education System (2009) Data

	Range	Mean	SD
<i>Percentage Of Students Double Majoring</i>			
	0 to .88	0.09	0.08
MALE	0 to .95	0.09	0.09
FEMALE	0 to .83	0.08 ^a	0.10
ANGL (Anglo-American, White)	0 to 1.00	0.09	0.09
AFAM (African-American, Black)	0 to 1.00	0.06 ^b	0.10
ASAM (Asian and Pacific-Islander)	0 to 1.00	0.08	0.15
LATN (Latino, Hispanic)	0 to 1.00	0.09	0.14
<i>Double Major Specific Controls</i>			
Number Of Majors	0 to 106	26.11	17.18
School Operates On Quarter Calendar	0 to 1 (DV)	0.05	0.22
Study Abroad Available	0 to 1 (DV)	0.88	0.32
<i>Institutional Type</i>			
BA Is Highest Degree Offered	0 to 1 (DV)	0.19	0.39
Public College or University	0 to 1 (DV)	0.38	0.48
Undergraduate Student Enrollment	104 to 45597	4512.05	5778.55
<i>Demographic Composition</i>			
% Traditional-Aged Students	0 to 1.0	76.81	18.31
% White Students	.06 to .98	63.49	23.33
% Female Students	0 to 1.00	57.69	12.04
% Student Loan Recipients	0 to 1.00	54.44	21.04
<i>Inter-Institutional Stratification</i>			
High (25 th %-ile above 1150/23) SAT/ACT Composites	0 to 1.00	0.08	0.23
Percent Admits	.07 to 1.00	64.88	17.94
Tuition	\$686 to \$45,818	\$16,772.40	10384.65
Full-Professor Salaries (logged)	10.52 to 12.17	11.29	0.29
Students Graduating In Four Years	0 to .93	35.53	22.18
Student:Faculty Ratio	5:1 to 47:1	15.20	4.53

N = 1462 institutions

^a Female mean is significantly ($p < .0001$) different from male mean

^b African-American mean is significantly ($p < .0001$) different from Anglo-American mean. Asian and Latino means are not.

Section 6

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