

Demographics, Purpose, and Dreams: Predicting Entering College as an Undecided Major Student

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Undecided students who self-identify as uncertain of their academic path represent a unique population to support from an academic advising perspective. In a sample of 257,813 students who entered 243 four-year institutions nationally, this study examined the relationship between students who selected undecided as their intended college major and individual student characteristics. Results indicate a primary predictor of undecidedness is student acknowledgment of indecisiveness about their choice of major or career; however, undecidedness also is related to interpersonal and contextual characteristics previously unexamined. Advisors should assess students' level of major and career certainty, concerns about financing college, and aspects of students' identities that were predictive of undecidedness.

[doi:10.12930/NACADA-22-42]

KEY WORDS: undecided, major, first-year students, undeclared

Academic advisors support students as they navigate the college major choice or change process. Students undecided on a major are a unique and growing population. Nationally, the proportion of entering first-time, full-time college students in the U.S. who selected *undecided* as their intended college major increased from 1.7% in 1966 to 8.9% in 2015 (Eagan et al., 2016). Students who self-identify as undecided are only a portion of the students in college who are unsure of their academic and career plans. As many as 75% of college students will change their major at least once (Gordon & Steele, 2015). Research on undecided majors is dated. This study offers advisors an updated and expanded examination of the factors associated with undecidedness across a national sample of first-year students to inform individual advising conversations and programmatic interventions.

Research has shown mixed results about the differences between undecided and decided students regarding academic achievement (Anderson et al., 1989; Foote, 1980; Leppel, 2001) and persistence

(Foote, 1980; Lewallen, 1994; Spight, 2022). Further, students frequently decide about majors before they have adequate information about majors, careers, or the process of decision-making (Gordon, 1985; Grites, 1981). A period of uncertainty about major is common within students' developmental trajectories (Grites, 1981; Titley & Titley, 1980). Being undecided may benefit students who are uncertain about their career, those learning about available major options, and those who have a career in mind but could choose one of many majors in pursuit of that career.

College costs have increased while state support for higher education declined (Alexander, 2000; Archibald & Feldman, 2010; Honu, 2019). Concerns about the cost of education and the employment outlook for college students have heightened stress among college students (Guo et al., 2011), which can affect how students consider and explore their major and career options (Stater, 2011).

Making a major selection in the first year requires an understanding of self that institutions can facilitate through advising programs and interventions to assist students with the transition to college and the major exploration process. Knowing which factors most strongly predict undecidedness among incoming first-year students would help identify priorities among advisors and career counselors for such interventions and resources. This study examines undecidedness among a more recent cohort of students at hundreds of institutions and across a wider range of characteristics than previously considered.

Literature Review

“The term undecided is used as the descriptor for students unwilling, unable, or unready to make educational and/or vocational decisions” (Gordon & Steele, 2015, p. viii). For this study, students self-report being undecided when asked what their intended major is on the Cooperative Institutional Research Program (CIRP)

Freshman Survey, administered before starting their first year of college. While our study examines variables related to students who select undecided as a major choice, the literature focused more on predictors of decided majors. Additionally, research on undecidedness is often conflated with career uncertainty. Therefore, we draw on literature regarding college student major selection to expand our study.

Research has mostly not found significant differences between decided and undecided students based on student background characteristics, making it difficult for advisors to determine patterns by subgroups, including race (Anderson et al., 1989), high school GPA, test scores (Anderson et al., 1989; Baird, 1967), or parental education (Pearson & Dellmann-Jenkins, 1997). However, Engle and Tinto (2008) found that students whose parents had little or no college experience were slightly less likely to be undecided. Differences by sex yielded mixed findings. Anderson et al. (1989) and Foote (1980) found no significant differences between undecided and decided students by sex. Pearson and Dellmann-Jenkins (1997) found that females were more likely to be undecided. Cultural and generational factors may have a role to play in undecidedness, and more recent data focused on this population of students is needed. More recent research on undecided students focuses on programs and experiences rather than individual student characteristics.

Multiple studies have found that men are more likely than women to major in business, science, math, and engineering (Leslie et al., 1998; Mullen, 2014; Porter & Umbach, 2006). Women are more likely to select majors in social sciences, humanities, and health-related fields (Porter & Umbach, 2006; Simpson, 2001). Additionally, women with mothers in professional or executive occupations were less likely to select education majors (Leppel et al., 2001). However, Ma (2009) found that women were just as likely as men to select lucrative majors—like business—that lead to higher-paying careers when socioeconomic status was a factor.

Other research identified racial and ethnic differences in major selection. Within those studies, academic preparation—specifically high school courses and standardized test scores—was more predictive of major than race or ethnicity (Simpson, 2001). Students from families with a lower socioeconomic status may be more drawn to majors leading

to higher-paying jobs after graduation, such as business, technical, and life/health science fields (Ma, 2009). Additionally, students with parents in professional or executive occupations associated with higher socioeconomic status are more likely to major in engineering and the sciences (Leppel et al., 2001). Families with high socioeconomic status secure advantages for their children and influence college major decisions through family work values, risk aversion, academic support, and preparation for college (Ma, 2009).

Some studies comparing undecided and decided students focused on students' goals, views, involvement with career development activities, or career decision-making self-efficacy. For example, undecided students were more likely to identify occupational preparation or a desire to become educated as reasons for attending college (Gordon & Steele, 2003). Political views might also play a role: Students with more liberal views were more likely to select a non-science major (Porter & Umbach, 2006). Orndorff and Herr (1996) found undecided students scored lower on career development activities—such as identifying and exploring values—major decidedness, and career decidedness. Similarly, Bullock-Yowell et al. (2014) found that undecided students reported lower confidence in identifying a career path. Undecided students also reported more negative career thinking and career decision-making difficulties (Bullock-Yowell et al., 2014).

We used Social Cognitive Career Theory (SCCT) to inform our analyses. SCCT highlights the interpersonal and contextual variables that influence the career choice process among young adults (Lent et al., 1994). Interpersonal variables refer to students' self-efficacy, outcome expectations, and goals; contextual variables include gender, ethnicity, and social supports (Lent et al., 2000). SCCT suggests that all these variables contribute to developing interests, decision-making, and success within career and educational applications (Lent et al., 2000). In SCCT, student background characteristics (e.g., socioeconomic status, parental education) and differential access to career information or opportunities (e.g., role model exposure, support for activities) inform early learning experiences, which influence self-efficacy and outcome expectations (Lent et al., 1994). The learning experiences, contextual influences, self-efficacy, and expectations create the foundation for career and educational interests (Lent et al., 1994). As mentioned, Bullock-Yowell

et al. (2014) found undecided students reported lower levels of career decision self-efficacy according to SCCT. These variables allow us to explore characteristics specific to undecided students and variables key to advising conversations.

Research has highlighted the importance of student characteristics, goals, values, and priorities for college and future careers. This study determines the characteristics of undecided students as they transition to college. Assessing the significant predictors of undecidedness within the current context of college-going and among a national sample of first-year students offers an updated understanding for advisors and career counselors that can inform programming, career exploration courses, individual advising conversations, and career coaching. Targeting these students with advising interventions and support can help address these uncertainties during that transition to college or beyond (Hansen & Pedersen, 2012).

Objectives

This study explores the characteristics of incoming undecided students within a nationally representative sample of U.S. first-time, full-time, first-year college students. Our analyses reveal key characteristics associated with being undecided within the current context of higher education and the broader economy to inform academic advising interventions and career services programming. We addressed the following research questions:

- RQ1. How do the demographics, background characteristics, and expectations for college vary between those who are undecided on their major and those who have selected a major at college entry?
- RQ2. What are the personal, individual characteristics and factors that predict the selection of undecided as a major at college entry?

Methods

Data Source

The data are drawn from a merged data set of the 2016 and 2017 CIRP Freshman Survey. This survey has been administered annually for more than 50 years to more than 15 million students and is widely used in research studies and institutional assessments (Higher Education Research Institute [HERI], 2023). HERI at UCLA administered the survey and permitted us to use these

data. The analyses reflect responses from 257,813 first-time, full-time students who entered 243 four-year colleges and universities of varying selectivity and type in the fall of 2016 or 2017.

This study's weighted and normalized sample is 248,493, 8.2% of whom identified as undecided in response to the prompt: "Please indicate your intended college major." The question was phrased so that respondents were free to mark what they intended to choose as a major, even if institutional restrictions might have prevented them from doing so upon college entry. We excluded from the sample respondents who did not answer the question about their intended college major. For a complete discussion of the normalization and weighting decisions for the 2016 and 2017 administrations and a discussion of the CIRP freshman survey constructs included in our analyses (e.g., Habits of Mind, Pluralistic Orientation, Academic Self-Concept), please see Eagan et al. (2017) and Stolzenberg et al. (2019). We also normalized the weights to avoid false effects due to inflated sample sizes. We combined data sets to understand better the experiences of undecided students, as they comprise approximately 8% of respondents in each data set. No major differences in the survey designs or administration procedures between these two survey administrations would impact our analyses. The economic and national conditions were arguably similar in 2016 and 2017.

These surveys offer students 88 intended college majors across specific fields (e.g., business, education, biological sciences) and areas in addition to *other* and *undecided*. We focused on students who marked *undecided*. The benefit of these data over institutional data is that respondents to this survey were not bound by institution-related restrictions. Further, any respondents who might have felt compelled or persuaded to select a major on their campus before they were truly ready would not be bound by those pressures when completing this survey. These surveys also included demographics, high school experiences and attitudes, expectations for college and career, and other values and measures that describe the student before starting college.

Sample

Of the sample, 55% identified as female, and 8.7% identified on the queer spectrum. Approximately one-third (31.1%) were first-generation, meaning neither parent had completed a college degree. About two-thirds (67.7%) had some or considerable concerns about their ability to finance

college, and 79.5% received at least some aid that did not need to be repaid (e.g., grants, scholarships, military funding, etc.). Some 28.6% received the Pell Grant. More than half of the respondents (57%) attended their first-choice institution, and 14.7% of the sample said there was “no chance” of changing their career choice.

Measures

The key dependent variable—students’ self-reported major undecidedness—was coded dichotomously (i.e., undecided vs. decided). Students who selected any specified major option or the *other* major option were coded as decided. Additional key predictor variables selected for possible inclusion in the model based on prior research and theory included demographics (e.g., gender, first-generation college status); high school experience (e.g., felt depressed, consumed beer); reasons for attending college (e.g., to get training for a specific career); goals for college or career (e.g., study abroad, make a theoretical contribution to science); and personal values or attitudes (e.g., Pluralistic Orientation). Our analyses used three composite constructs developed by HERI: Habits of Mind, Academic Self-Concept, and Pluralistic Orientation (see Eagan et al., 2017).

Data Analysis

The first research question was addressed using frequency distributions, two-way and three-way crosstabs, and *t*-tests comparing undecided and decided major students. We used logistic regression to answer the second research question, determining key predictors of entering college undecided. The regression results include odds ratios because all the predictors in this study were categorical, and the dependent variable was dichotomous. The fit of the final model was decided by examining the significance levels of each variable. Nonsignificant variables artificially inflate fit indicators (Hosmer & Lemeshow, 2000) and were removed. Our large sample size led us to use a more stringent criterion for variable inclusion ($p < .01$). The -2 Log Likelihood, usually referred to as G2 or scaled deviance (Cabrera, 1994) for this model was 50038.67; the chi-square (χ^2) value was 32037.15 ($p < .001$). The model correctly predicted 88.0% of the cases (see Table 1).

We also performed a ROC analysis and found that the model was excellent (area under the curve [AUC] = .904, 95% confidence interval: .902–.907, $p < .001$), which prior research

defined as having an AUC greater than .90 (Scruggs, 2013; Trost et al., 2012). The model correctly predicted 88.8% of cases where majors were selected and 78.4% of undecided cases. Of note, despite the excellent fit of the model, the goal of this research was not a machine learning model that might be randomly applied to students, but rather to understand from a theory-based approach the predictors that advisors should and could consider when talking with students. Nevertheless, the strong results indicate that our model strongly identifies significant factors related to undecidedness, hopefully adding confidence to advisors trying to determine where to focus their attention when meeting with students.

Results

Characteristics of Incoming Undecided First-Year Students

In response RQ1, we found many significant differences between undecided and declared major students. A significantly greater proportion of female-identifying students were undecided (9% vs. 7.2% of males). More undecided students consumed alcohol in high school (34.2% of undecided students drank beer vs. 29.0% declared; 39.6% of undecided students drank wine or liquor vs. 34.6% declared). A higher proportion of undecided students felt “occasionally” or “frequently” depressed in the previous year (8.5% vs. 7.8% of those who never felt depressed).

When it comes to funding their education, undecided students reported less financial concern and higher household incomes: 34.1% of undecided students had no financial concerns versus 31.9% of declared students. Regarding financial aid, 24.8% of undecided students (vs. 20.0% declared) reported not receiving any financial aid that need not be repaid (e.g., grants, scholarships, military funding). Students who received a military grant, work-study, Pell Grant, need-based aid, or merit-based aid were all significantly less likely to be undecided (7.6% vs. 9.7% of those who did not receive this aid). Students who placed the highest importance on choosing a college because of financial assistance or cost (7.8% and 8.0%, respectively) were less likely to be undecided (vs. 9.4% and 9.3% of those who said financial assistance or cost was not important).

Students’ self-awareness about future major or career choice changes was also significant. Nearly half (46.6%) of the undecided students said there

Table 1. Logistic Regression Results Predicting Entering College as an Undecided Major Student

Variables	Beta	SE	Odds ratio	Sig
Intention to change major field (comparison: <i>no chance</i>)				
<i>Very little chance</i>	.539	.080	1.714	***
<i>Some chance</i>	1.784	.075	5.954	***
<i>Very good chance</i>	2.909	.076	18.343	***
Undecided about career choice	2.879	.025	17.793	***
Attending your first choice college	.171	.025	1.186	***
Prelaw	.156	.050	1.168	**
TFS Habits of Mind score	-.007	.002	.993	**
TFS Academic Self-Concept score	-.017	.002	.983	***
Reason for attending college: To get training for a specific career (comparison: <i>very important</i>)				
<i>Not important</i>	-.086	.049	.918	
<i>Somewhat important</i>	-.269	.047	.764	***
Goal: Making a theoretical contribution to science (comparison: <i>essential</i>)				
<i>Not important</i>	-.101	.027	.904	***
<i>Somewhat important</i>	-.330	.039	.719	***
<i>Very important</i>	-.406	.060	.666	***
In the past year, felt depressed (comparison: <i>frequently</i>)				
Felt depressed: <i>Not at all</i>	-.107	.027	.899	***
Felt depressed: <i>Occasionally</i>	-.109	.040	.897	**
Having <i>some</i> or <i>major</i> (vs. <i>none</i>) concerns about financing college	-.113	.027	.893	***
Recipient of any aid that need not be repaid (e.g., grants, scholarships, military funding)	-.116	.029	.890	***
Sexual orientation: queer-spectrum (comparison: <i>heterosexual/straight</i>)	-.152	.043	.859	***
<i>Definitely</i> planning on having a science-related research career	-.335	.042	.716	***
Intercept		-3.597		
Number of cases in the analyses		257,813		
Model chi-square, <i>df</i>		32037.15, 29		
-2 Log Likelihood		50038.67		
Pseudo R squared	.188 (Cox & Snell),	.455 (Nagelkerke)		
Percent correctly predicted		92.5%		

$p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

was a very good chance that they would change their major field. It was unclear whether respondents interpreted this expectation as a future change (i.e., the switch from undecided to picking a major). Undecided students also indicated they were more likely to take a temporary leave of absence from college (51.9% vs. 44.9% declared) or to transfer to another college before graduating (26.4% vs. 21.8% declared).

Students' expectations for college and beyond also revealed differential patterns in undecidedness. Students with a goal of making a theoretical contribution to science were less likely to be undecided (3.7% of students planning on a science-related research career vs. 8.9% of students planning something other than a science-related research career). Additionally, 66.2% of undecided students were undecided about their career plans (vs. 5.6%

of declared). These results reveal noteworthy differences between undecided and declared major students within the descriptive data, but not the extent to which these variables help predict undecidedness and whether they remain significant after accounting for other variables. These are addressed within our second research question.

Predictors of Undecidedness

In response to RQ2, the logistic regression revealed variables predictive of entering college as undecided (see Table 1). After holding other variables constant, the strongest predictor of undecidedness was the student self-reporting a “very good chance” of changing their major in college; these students were 18 times as likely ($p < .001$) to be undecided than those who said there was “no chance” of changing their major. Even those who anticipate “some chance” of changing their major were nearly six times as likely ($p < .001$) to be undecided. Students who were undecided in their career choice were nearly 18 times as likely ($p < .001$) to be undecided. Intention to change majors and career undecidedness were by far the two strongest predictors, as indicated by the size of the odds ratios.

All other predictors in the model were significant at the ($p < .001$) level and with relatively smaller odds ratios, indicating that these were important related to undecidedness but might not be the primary focus of the conversation with students. In contrast, all the remaining variables in the model were predictive of being less likely to be undecided.

Those who said that making a theoretical contribution to science was anything less than “essential” (i.e., very, somewhat, or not important) were between 10% and 41% less likely to be undecided. Certainty desiring a science-related research career was also significant, as students who “definitely” plan for that type of career were 34% less likely to be undecided. Those who said that attending college to get training for a specific career was “somewhat important” were 27% less likely to be undecided. Students identifying on the queer spectrum were 15% less likely to be undecided than heterosexual or straight-identifying students. Students expressing some or major concerns about financing college were 11% less likely to be undecided than those expressing no concerns about financing college. Those receiving grants, scholarships, or military aid were also about 12% less likely to be undecided. One aspect of mental health

also emerged as a significant predictor. Students who reported feeling “not at all” or “occasionally” depressed in the past year were 11% less likely to be undecided (in comparison to those who marked “frequently” depressed). Students who scored higher on the Habits of Mind or Academic Self-Concept constructs also were less likely to enter college as undecided majors.

Discussion

The greatest predictors of being undecided can be assessed directly with students by asking about their expectations of changing their college major and their level of certainty about their future career choice. In practice, all benefit when advisors talk with students about career plans and provide career exploration and decision-making tools to those who express uncertainty about their career, regardless of their major certainty level. Talking with students about their career and major uncertainty also helps normalize the developmental and exploratory experience (Grites, 1981; Titley & Titley, 1980), easing the anxiety such uncertainty may create (Gordon & Steele, 2003; Hagstrom et al., 1997). While these findings might seem intuitive, our study uses a recent, national sample of undergraduate college students to prove the strong connection between entering college as an undecided student and students’ expectations to change their major or career choice.

Additionally, students with concerns about paying for college and those receiving grants, scholarships, or military aid are less likely to be undecided. Greater financial pressures may increase the need to be certain about college plans, major options, and pathways. Lower-income students may feel the pressure of not delaying their progress or extending their time to degree by being undecided. Mullen (2010) discussed the freedom afforded students from higher socioeconomic status families to pursue intellectual interests not directly connected to a career, such as liberal arts majors. Advisors could ask students about their finances and consider their concerns about cost when exploring other majors.

In terms of personality characteristics, results were mixed. Overall, students with a greater sense of purpose and self-confidence regarding college and how they want to create change in the world are slightly less likely to be undecided. Students who scored higher in Habits of Mind and Academic Self-Concept or those who said it was “somewhat important” to attend college for specific career training are less likely to be

undecided. And although a relatively small proportion, those who said they “definitely” plan to have a science-related research career also are less likely to be undecided. These findings support the need for precollege opportunities and resources to develop strong interests and self-confidence about career choices and abilities. Precollege resources about career and major options—summer bridge programs and college recruitment efforts—could help students better understand majors and career opportunities before they identify a major during the admissions process. These programs may also reinforce the personal benefits of college and of major selection choice. Advisors could discuss these dimensions and encourage students to consider which college experiences might further strengthen or clarify students’ awareness in these areas. Finally, students who are frequently depressed are more likely to be undecided. This too, may be an area for advisor exploration.

Social Cognitive Career Theory

The findings support using SCCT as a lens to focus on interpersonal and contextual variables to understand incoming students’ interests and aspirations (Bullock-Yowell et al., 2014). Findings highlight the influence of interpersonal variables on the likelihood of undecidedness at the time of initial enrollment. For example, knowledge of students’ desires to have a science-related research career and higher scores on constructs such as Habits of Mind and Academic Self-Concept all help advisors understand interpersonal student-level measures. Similarly, contextual variables help predict the likelihood that students will enter college as undecided.

Implications for Practice

The implications for advising practice are compelling. Findings suggest that advisors ask questions beyond whether the student has selected a major to gauge whether the student is anticipating changing majors. Knowing an incoming student’s major certainty level—and their anticipated loyalty to a major—is a key determinant of undecidedness and is easy to ask about within an advising appointment. For example, if students are anticipating a future major change, the advising conversation might address which majors the student is considering, what past experiences or influences have played a role in that decision, and what college experiences might help focus the list of options.

Similarly, advisors asking about students’ certainty regarding their career choice can reveal

helpful information because not all students undecided about their major are also undecided about their careers. For example, students who are certain about their career (e.g., law) could be uncertain about potential major choices and their best fit. Another possibility is that students need more information about the career opportunities afforded by majors of interest. This mirrors research linking undecidedness and lower career decision-making self-efficacy (Bullock-Yowell et al., 2014).

Student background, expectations, and goals are key considerations when advising students and discussing plans, as suggested by SCCT. Advisors should discuss contextual and interpersonal areas with entering first-year students, which can help identify undecided students and those likely to become undecided. Scales, such as the Career Decision Self-Efficacy Scale, could be incorporated into first-year courses and career or major exploration programming (Betz et al., 2005). These assessments provide a better understanding of the reasons for being undecided, which can help inform advising interventions created for these students and enhance advising conversations and relationships to support exploration and decision-making. For example, how do we help students who do not have a clear pathway to their intended career (e.g., law), and how might that approach differ from helping a student who has yet to choose a career?

Graunke et al. (2006) identified the benefits of being undecided if students’ commitment to the institution and desire to complete a degree were high. Better understanding which students come into college undecided helps advisors intervene earlier and address issues such as time to degree and differences of income that might impact how students think about their major options. Advisors with high advising ratios or those seeking to quickly understand their incoming students might want to focus on students’ self-reported plans to change their major or career to gauge who might be most likely to be or become undecided. Following up with these students to ask about their goals, values, and aspirations can offer further understanding of the exact nature of their career or major undecidedness.

Limitations and Future Research

One potential limitation of this study is that undecided students may feel compelled to indicate a major on the survey. Conversely, there may be students who selected undecided but are nearly certain about their major choice or are

choosing between clear options. In other words, undecidedness may be more fluid than can be captured by a dichotomous variable. However, we feel value in honoring students' selections on the intended major question. In response to the question measuring the likelihood of changing major, we do not know if undecided students conceptualized moving from undecided to a major as a *change* in their major. It could be that undecided students responding to this question were referring to a future likelihood of declaring one major and then changing to another major. Future research might explore the variation among students about their intended major.

Another limitation is that we captured these students at one point and do not know whether this initial undecided status played any role in their college success. Future research is needed to determine whether entering college with a major selected improves time to degree. Future research also might explore whether being undecided plays a role in the adjustment to college in the first year. If being undecided is beneficial, understanding what predicts being undecided can help inform advising practices to support these students. Future research should address institutional policies and advising practices that may encourage or discourage being undecided. Finally, future research may consider replicating this predictive model for specific groups of students (e.g., women, first-generation college students) and students at two-year institutions, transfer students, students returning to college after an absence, and post-COVID-19 cohorts of students.

Conclusion

Research has found correlations or suggested potential areas related to undecidedness; however, much of this literature is dated. This study of a representative sample of first-year college students at four-year institutions contributes to the gap in the research on undecided students because of the time that has elapsed since these students have been studied on a national scale. This study offers more predictors and odds ratios of undecidedness across a wider variety of student characteristics, values, and experiences. It expands our understanding of why students are undecided and offers new questions for research regarding the patterns that emerge in this study. Understanding these dynamics within students' lives helps direct our welcoming and advising efforts for undecided students. Our approach offers direct implications

for advisors and those working with current and future undecided students.

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