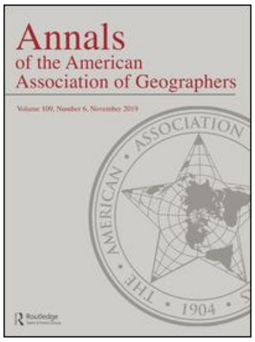

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The academic discipline of geography, faced with increasing competition from cognate fields and declining undergraduate enrollments, continues to suffer an identity crisis. In recent decades, many geography programs have instituted department or degree name changes, or otherwise rebranded, without any evidence guiding these decisions. This study begins to build an evidence base for these decisions by presenting results from a survey of 4,388 undergraduates across four U.S. universities to understand how students rate key words that commonly appear in geography course descriptions and titles and phrases that comprise degree and department names. Undergraduates overwhelmingly and consistently preferred simple, thematic types of terms to those that sounded more technical or science oriented. Forms of the word *geography* were rated significantly lower than words or phrases containing *environment* and *sustainability*. Forms of geography that included the word *science* were rated particularly low. Student ratings varied by class standing, major, gender, high school location (United States vs. outside of the United States), whether the student had previously enrolled in a geography course, and self-perceived numeracy. Multivariable analysis revealed potential opportunities for targeted undergraduate recruiting and curricular development. This study is an important step toward reconciling contemporary student perceptions of geography and related fields with departmental identities and the disciplinary jargon often used in program and course descriptions. We offer a toolkit for implementing similar research at other institutions and ultimately helping geography programs recruit and retain the next generation of geographers. *Key Words: academic identity, administration, geography education, program branding, recruitment, survey research.*

The academic discipline of geography continues to suffer an identity crisis related to popular (mis)perceptions of geography and its intersection with other disciplines, a phenomenon that has been documented for at least sixty years (Alexander 1959). New academic programs, particularly in the environmental and sustainability sciences and studies, have nibbled at the edges of—and often created significant overlap with—university content traditionally taught by geography departments. One significant consequence has been the decades-long trend of U.S. geography departments merging with other departments or strategically renaming and rebranding themselves and their degree programs to capture student enthusiasm for environment, sustainability, global studies, or other cognate disciplines (Frazier and Wikle 2017).

Some department name changes have been driven by administrative changes such as modifications to institutional general education requirements or transition to a responsibility center management budgeting model that generally strengthens the ties between course enrollments and departmental revenue allocation. Other name changes have been a response to competing programs, pedagogical synergies, or other efforts to raise the department's profile on campus. These issues have hardly been confined to U.S. higher education, because a similar trend toward multidisciplinary geography departments occurred at universities in the United Kingdom (Hall et al. 2015) and New Zealand (Crozier 2006; W. Smith 2006) over the past two decades—changes that have primarily been driven by financial or administrative pressures.

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Frazier and Wikle (2017) interviewed senior faculty members from geography departments that had recently changed their name, and the recruitment of more undergraduate majors was only the third most frequent reason cited for the change after "other" (e.g., budgetary, administrative reorganization, evolution of the discipline or department) and "enhance the department's on-campus standing." The same faculty also reported that the most favorable impact of name changes was perceived to be undergraduate student recruitment, but name changes occur in the context of varying institutional politics and preexisting programs. Few, if any, name changes have been evidence based with respect to student perceptions of candidate names or whether name changes resulted in improved student enrollments or a higher number of degrees conferred.

This study begins to fill the gap in our knowledge of how undergraduate students perceive the language used to identify programs in geography, environment, and sustainability. We surveyed 4,388 undergraduates in person across four U.S. universities of varying student body sizes and geographic locations to understand how students rate key words that commonly appear in geography course descriptions and titles and phrases that comprise degree and department names. We present baseline evidence that consistently suggests that some of the most commonly used jargon, particularly in geography, might be undermining undergraduate recruiting efforts and that this academic disconnect is eminently fixable by listening to our students. We offer a toolkit for implementing similar research at other institutions and reflect on the ways in which these data can help geography programs recruit and retain the next generation of geographers.

Background

The twentieth-century evolution of geography as an academic discipline was punctuated by periodic reflections on its core tenets that are familiar to any geography graduate student or professional (e.g., Fenneman 1919; Davis 1932; Schaefer 1953; Pattison 1964). The latter half of the twentieth century saw somewhat of a shift away from grappling with geography's core ideas and traditions to fretting over the discipline's standing and relevance in the academy (e.g., Alexander 1959; Lukermann 1964; R. L. Carter and Steinbrink 1974; Dawson and Hebden 1984; de Blij 2005, 2012; Johnston 2006) and cautioning about geography's demise (Wilbanks and Libbee 1979), at least in part spurred by the signal of Harvard University closing their geography program in 1948 (N. Smith 1987). Alexander (1959) went a step further and had the audacity to suggest that, to improve how nongeographers view the discipline, geography might benefit from a name change to "regional science." Alexander's commentary was perhaps the birth of the renaming debate in print and prompted a series of responses that either applauded (Thompson 1960) or repudiated the idea (Borchert 1960; Dodge 1960; Lowenthal 1960; R. E. Murphy 1960). These arguments remain part of today's discourse about the academic utility of the term *geography*. Thompson (1960, 5) noted the "ambiguity and misleading character" of the word geography and suggested alternative titles for core geography courses that were scrubbed of the word (e.g., renaming Economic Geography to Natural Resources and Industries). Geography's defenders cited continuity and tradition, expressed concern about subdisciplinary factionalism (R. E. Murphy 1960) and narrow and restrictive naming alternatives (Dodge 1960; Lowenthal 1960), and argued that quality geographical research breeds growing awareness of geography's necessity (R. E. Murphy 1960). Borchert (1960) even recommended the implementation of surveys of North American geographic scholars, professionals, and "those connected in any way with elementary and secondary education" (15) to help guide decision making, but not students themselves.

Over a decade later, R. L. Carter and Steinbrink (1974) tried to reframe the debate as requiring a shift "from the product concept to the marketing concept" (1), emphasizing the need for geography to improve how it communicates its competitive advantages to students and the public in a changing world. The ensuing decades produced curricular adjustments such as Alliance Summer Geography Institutes beginning in the 1980s (Kenreich 2004), the Commission on College Geography in 1991, a Virtual Geography Department project in the mid-1990s, and the Geography Faculty Development Alliance in the early 2000s (A. B. Murphy 2007). Estaville, Brown, and Caldwell (2006) offered a template for successful undergraduate recruitment that emphasized vigorous marketing of geography, as well as surveying current and incoming students about their perceptions of geography and factors that led to declaring the major.

Two National Research Council (NRC) reports on geography focused on strategic opportunities for the field of geography (NRC 1965, 1997), but it was the third (and most recent) in 2010 that revived the naming and branding discourse for the past decade.

The branding of geography returned to the fore after NRC's (2010) geography report, *Understanding the Changing Planet: Strategic Directions for the Geographical Sciences*. The report's name inherently drew a distinction between geography and geographical sciences, one that Winkler (2011) critiqued in a special issue of *The Professional Geographer* that featured multiple responses to the NRC report by prominent geographers. *Understanding the Changing Planet* was an agenda-setting document that focused on maximizing the geographical sciences' overall contribution toward grand challenge types of problems (i.e., the kind that the National Science Foundation would fund) but had little to say about maintaining a pipeline of students that would sustain the field. The report briefly addresses training in "Part III: Moving Forward," a section that was not part of the authoring committee's initial charge and thus was streamlined in the final report (A. B. Murphy 2011). The section's summary Box I, "Key Questions for Training Programs in Geography/Geographical Sciences," focused on whether students are receiving an adequate balance of theory and skill building to further their research and ask big questions but seemed to take it for granted that geography programs are widely perceived by students as vehicles for such endeavors. A published set of NRC report evaluations (Barnes 2011; Clarke 2011; Johnston 2011; A. B. Murphy 2011; Robbins 2011; Sui 2011; Winkler 2011) produced many valuable insights about geography's future, but none reflected on the translation of geography's opportunities into student curricula. Barnes's (2011) title was particularly apt: "This is like déjà vu all over again." Such debates were occurring in the context of geography's declining presence in high school curricula and decreases in the number of geography bachelor's degrees conferred nationwide through the 1990s and early 2000s (Estaville, Brown, and Caldwell 2006), before rebounding later in the 2000s (A. B. Murphy 2007). It is no wonder that undergraduate students often do not relate to geography; in 2013, just ten states required a geography course for high school graduation (Brysch 2014).

The discourse around nomenclature was again revived when Winkler (2014) used her April 2014 American Association of Geographers (AAG) President's Column to recap an AAG Council discussion about the trade-offs of department renaming. The conversation at the AAG Council was spurred by an article describing how the field of psychology was enduring the "sciencing" of department names, for example, the trend of changing department names from Psychology to Psychological Sciences, Psychological and Brain Sciences, Psychology and Neuroscience, and so on. This trend clearly resonated with geography departments. Winkler summarized perspectives on many of the same issues that had been discussed previously in the literature, such as issues of identity, institutional politics, and the science versus studies quandary.

In response, Frazier and Wikle (2017) surveyed the trends in how geography departments were renaming themselves between 1990 and 2014; this was perhaps the first study to seriously examine the nomenclature of department and program names. Frazier and Wikle (2017) recapped the origins of geography as an academic department and the general context of rebranding in the academy. Their work highlighted the prevalence and key drivers of renaming and branding, but some of their conclusions underscored uncertainty about the consequences of these name changes. Whereas many interviewed faculty members perceived improvements in undergraduate recruiting, others reported negative effects on recruiting and feared that the changes might ultimately undermine geography as a discipline. Frazier and Wikle (2017) reconciled this dichotomy by noting that although new names and degrees might seem to undermine geography, they might simultaneously draw in new students who ultimately are "exposed to what geography is and what geographers do" (20). If we accept that we sacrifice some relative degree of geography's luster by using alternative department or degree names, how do we, as Winkler (2014) put it, "focus on how to use renaming and rebranding to our advantage, while minimizing potential negatives" (1)?

Other scholars soon took note. Swanson, Caslow, and Conrad (2018) interviewed geography majors and education graduate students (i.e., future K–12 social studies teachers) to assess basic geographic knowledge and to determine how they perceive geography's value as a discipline. The study's key findings included a disconnect between general knowledge and spatial knowledge among teaching credential students and undergraduate geography majors' frustration with popular misconceptions about their degree program and career prospects. The study also presented a series of recommendations for incorporating more geography into our educational curriculum. As far as we know, this was the first study to solicit student perspectives about geography and disseminate those results.

In April 2018, the Annual Meeting of the AAG featured a half-day Chairs Symposium titled "Encroachment or Opportunity? Defining Geography in a World of Environmental Studies, Global and International Studies, GIScience, Environmental Science and Sustainability Studies." This session included panelists and breakout groups and generally facilitated wide-ranging discussion concerning the trade-offs of embracing or resisting these renaming and rebranding strategies. Among the wide array of considerations for renaming a department or a degree, student perspectives were notably absent. In July 2019, Kaplan (2019b), as incoming AAG president, used his first President's Column in the AAG *Newsletter* to reiterate concerns over dwindling undergraduate geography enrollments—the number of geography majors had declined in the preceding six years (Flaherty 2018)—and highlight opportunities for student recruitment. Although the renaming and rebranding discourse has gained some steam in recent years, it has, for at least sixty years, remained more or less stuck in an academic echo chamber while high school education, higher education, technology, and our students continued to change.

This study surveyed undergraduate students across four universities to understand how they rate words and phrases used in the course, department, and degree names of geography, environment, and sustainability programs. Our study design enabled us to test a variety of research questions, such as these:

1. What are the most frequently mentioned search terms by undergraduates in the context of seeking a free elective course, and do these correspond to the most popular majors?
2. How do undergraduates rate geography-oriented key words and program names relative to other terms and phrases, and are there differences across institutions?
3. Are certain student characteristics, such as gender, primary major, class year, high school location, having previously taken a geography course, or perceived numeracy, associated with ratings of geography-oriented terms?
4. How do students rate the "sciencing" of geography; that is, geography-oriented program and degree names that have been updated to contain the word *science*?

This study provides baseline evidence of undergraduate preferences for some of the most common terminology used in U.S. geography, environment, and sustainability programs. We hope that our results, contextualized by our study's limitations, will both be useful for departments facing future renaming dilemmas and prompt additional inquiries that refine our findings and apply our methods to new educational contexts.

Methods

Site Characteristics

The intent of this study was to compare student responses from multiple public and private U.S. universities of different sizes and regions. Institutions were recruited through personal networks and by announcement at the Chairs Leadership Symposium of the 2018 Annual Meeting of the AAG to find geography departments that were either contemplating new rebranding or renaming strategies or had just implemented one. Eight institutions participated in discussions about joining the study, but several declined due to lack of funding, nearby natural disasters (hurricanes or fires), or high workloads. Ultimately four institutions participated: the University of Miami, Michigan State University, San Diego State University, and Coastal Carolina University. Table 1 contains summary information about each institution, including founding date, funding model, undergraduate and graduate enrollments, percentage of female and international students, cost of attendance, number of tenured or tenure-track geography faculty, and whether each geography department has a doctoral program.

University of Miami. The University of Miami (UM) is a private university located in Coral Gables, Florida, seven miles south of downtown Miami. The Department of Geography and Regional Studies, in the College of Arts and Sciences, offers a BA and BS in geography and an MA in geography. It remains the only U.S. geography department with *regional studies* in its name. After UM liberalized its general education requirements in 2014, the Department of Geography and Regional Studies experienced a significant loss of introductory-level

Table 1. Participant institution characteristics as of September 2018 and study sample summary with participant exclusion criteria

Characteristic	UM	CCU	MSU	SDSU	Total
Institution characteristics					
Founding date	1925	1954	1855	1897	
Funding model	Private	Public	Public	Public	
Undergraduate enrollment	11,133	8,482	35,268	30,165	
Graduate enrollment	6,171	735	7,711	4,663	
Percentage female students	52.5	53.6	50.5	54.2	
Percentage international students	14.3	2.1	11.8	7.1	
Cost of attendance (in-state)[a]	$62,274	$25,314	$28,428	$28,224	
Cost of attendance (out-of-state)[a]	$62,274	$39,986	$53,373	$40,104	
Number of tenured or tenure-track geography faculty	9	6[b]	26	17	
Doctoral program in geography	No	No	Yes	Yes	
Sample size characteristics					
Surveys initiated	1,304	509	2,154	868	4,835
Declined consent	2	2	2	0	6
Incompletes	90	6	103	141	340
Duplicates (via phone number)	2	0	5	1	8
Graduate students	14	0	74	5	93
Final sample size	1,196	501	1,970	721	4,388

Note: UM = University of Miami; CCU = Coastal Carolina University; MSU = Michigan State University; SDSU = San Diego State University.
[a]All university cost of attendance data retrieved from www.collegedata.com in December 2018.
[b]Includes three anthropology faculty.

course enrollments. The department responded by restructuring and expanding its curricula and has contemplated multiple options for a new department name that sheds regional studies and capitalizes on departmental strengths. As of 2019, no name change had been implemented.

Michigan State University. Michigan State University (MSU) is a land-grant public university located in East Lansing, eighty miles northwest of Detroit, and is among the top ten largest universities in the nation. The Department of Geography, Environment, and Spatial Science is situated in the College of Social Science. The department offers a BA in human geography, BS in environmental geography, BS in geographic information science, BS in economic geography, MS in geography, and PhD in geography. As of 2019, MSU remains the only geography doctorate-granting institution in Michigan. The human geography and environmental geography undergraduate degrees replaced traditional BA and BS programs in geography in 2014 in an effort to make the degree names more descriptive, and the economic geography degree was added in 2016. The geographic information science degree was introduced in 2005.

The department's name also changed to the current one in 2016 (from simply Geography) in response to new competing programs such as the BS and minor in environmental studies and sustainability in the Department of Community Sustainability and the Environmental Economics and Policy program in the Department of Agricultural Economics, both housed in the College of Agriculture and Natural Resources. The College of Social Science also developed a Global and International Studies major in the Interdisciplinary Social Sciences program. The former Department of Geography thus opted for a more descriptive name that was perceived to resonate better with students and the general public. MSU geography professor Julie Winkler, having previously authored an AAG President's Column in the AAG *Newsletter* about the renaming and rebranding of geography departments (Winkler 2014), provided important perspective throughout the process, which required extensive debate and negotiation across the MSU campus.

San Diego State University. San Diego State University (SDSU) is a public university that is the oldest and largest higher education institution in the San Diego, California, area and among the top twenty largest universities in the nation. The Department of Geography, situated in the College of Arts and Letters, offers a BA and BS in geography (the BS with emphases in environmental and physical geography and GIScience), an MA and MS in geography (the MS offering concentrations in

GIScience and watershed science), and a PhD in geography via a joint doctoral program with the University of California, Santa Barbara. The department emphasizes the phrase “Environment, Society, and Technology” in its campus branding and has sought creative ways to reinforce its campus position following the launch and growth of competing interdisciplinary programs that offer a BS in environmental sciences and BA in environmental studies and sustainability.

Coastal Carolina University. Coastal Carolina University (CCU) is a public university located in Conway, South Carolina, nine miles from Myrtle Beach. The Department of Anthropology and Geography is in the College of Humanities and Fine Arts and includes three anthropologists and three geographers. The department offers a BA in anthropology and geography with the choice of either an anthropology or geography concentration, minors in anthropology and geographic information systems (GIS), and a geospatial technologies certificate. It is a young department, formed from the merger of minors in anthropology (formerly in the Department of History) and GIS (from the former Department of Politics and Geography) in the fall of 2015.

Mobile Survey Instrument

A mobile survey instrument was developed and managed using Qualtrics cloud-based survey software and optimized for tablet computer, mobile phone, or laptop. The survey consisted of twelve items, began with an informed consent screen, and was designed and tested to be completed in about five minutes (excluding informed consent). See the Supplemental Material for the full survey text file and Qualtrics code.

The first item presented the student with an informed consent script and ended with the selection of *yes* (to continue) or *no* (to end the survey). The consent script was carefully worded to introduce the primary investigator and describe the project as “research about student perceptions of certain terminology commonly used in social science courses and departments” and did not name any departmental or disciplinary affiliation that might inadvertently prime the respondent.

The second item presented the student with a free text field and the following question: “If you had a free elective to fill with no restrictions, what search terms might you use if you were searching for a course today? Please type up to three words or phrases.” This question was later screened for joking responses (e.g., “butts”) that were occasionally amusing but thankfully very rare; these survey responses were coded as incompletes.

The third and fourth items, which collected student ratings of thirty-seven course key words and thirty department or degree phrases, were the heart of the survey. Item 3 began with the following question: “Next, here is a list of words or phrases that could hypothetically appear in a **course title**. If you had a free elective to fill with no restrictions, how attractive is each word in a potential **course title**?” For responses collected via tablet and laptop, the question appeared in matrix format with course key words randomized down the vertical axis and six Likert-style response options (scored 1–6) on the horizontal axis with no neutral option: *extremely unattractive*, *very unattractive*, *somewhat unattractive*, *somewhat attractive*, *very attractive*, and *extremely attractive*. On a mobile phone, the question displayed one term at a time with the six response options below, and for ease of use, after the student selected a rating, the software automatically collapsed that term’s response options and presented the student with the next term (see Figure 1). The thirty-seven course key words were selected via iterative expert review by study team members with different subdisciplinary backgrounds, with input from outside faculty reviewers at nonparticipating institutions. The key words were representative of human-, physical-, and digital-oriented terms commonly used in geography, environment, and sustainability course titles. One key word was customized as a local place name associated with each university (*Miami* for UM, *Michigan* for MSU, *San Diego* for SDSU, and *South Carolina* for CCU).

Item 4 began with a similar question: “Here is a list of words or phrases that could hypothetically appear in a **department or degree name**. To what extent would each one make you want to learn more about that **department or degree**?” Responses were collected using the identical style matrix format used to rate course key words, and we tested thirty words and phrases that we call department name *primitives*. These were systematically determined by cataloging the most common building blocks (i.e., primitives) of North American department names in the 2016–2017 AAG *Guide to Geography Programs in the*

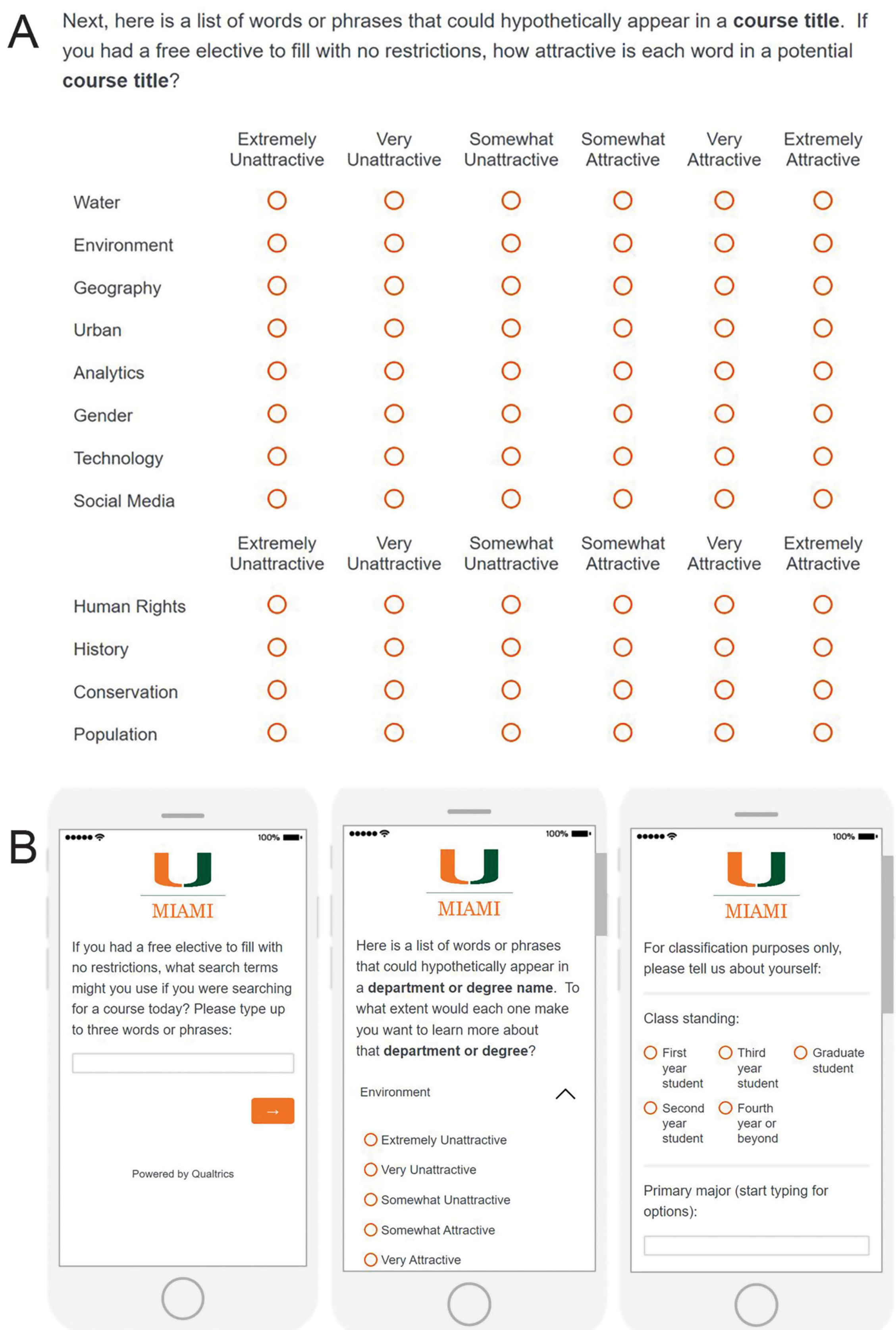

Figure 1. Sample graphical user interfaces from the University of Miami instance of the Qualtrics survey accessed by (A) tablet or laptop computer and (B) mobile phone.

Americas (AAG 2017). Our primitives include words and phrases such as *geography*, *geographical sciences*, *environment*, *environmental studies*, and so on. We again focused on geography, environment, and sustainability and excluded terms associated with other disciplines that appeared in geography department names due to departmental consolidation or mergers. For example, although there are several departments of anthropology and geography in the United States, we did not test the primitive *anthropology*, because this was beyond the scope of our study.

Items 5 through 11 captured student characteristics hypothesized to influence how students might rate geography, environment, and sustainability terms. Item 5 recorded the student's class standing (first year, second year, third year, fourth year or beyond, and graduate student), because the longer a student has attended college, the more he or she is likely to have encountered the academic terms we tested.

Items 6 and 7 recorded their primary and secondary majors, respectively, because students from majors related to geography, environment, and sustainability would be more familiar, on average, with the terms tested. We also used the major field to test differences in ratings between broad categories of majors, such as science, technology, engineering, and math (STEM) students or humanities students. The *major* items used JavaScript code to facilitate dynamic selection from a prepopulated list of the institution's undergraduate majors as the student typed. Only primary major was required, because not all university students declare a second major. Because we weighted responses by college or school but equivalent majors are not always in the same type of college at different institutions, we reclassified majors into *major types* that are college or schoolindependent to make apples-to-apples comparisons. Majors were also reclassified into three *areas of knowledge*: arts and humanities, people and society, and STEM. The crosswalk used to reclassify majors into major type and area of knowledge is available in the Supplemental Material.

Item 8 recorded the student's gender as *male*, *female*, or *declined*, because of long-observed gendered effects in students' declaration of majors (e.g., Zafar 2013).

Item 9 recorded whether the student attended high school in or outside of the United States (regardless of the language of instruction), because U.S. high schools are known to have relatively weaker geography curricula than most world regions (Gerber 2010), and international student enrollments in the United States have sharply increased since the 2008 economic recession (Hazen and Alberts 2013).

Item 10 recorded whether the student had ever enrolled in a university-level geography course, because we expected that experience to boost awareness of the terms tested.

Item 11 was the validated three-item version of the Subjective Numeracy Scale (McNaughton et al. 2015). Numeracy is essentially the numerical subcomponent of literacy (Ancker and Kaufman 2007), and subjective (i.e., perceived) numeracy measures have been shown to approximate objective numeracy measures, while also being easier to complete (Zikmund-Fisher et al. 2007; Dolan et al. 2016). Students rated themselves on three questions, using a 6-point Likert-style scale, that measure self-reported numeracy; that is, how quantitative they perceive themselves to be. The responses are summed into a three-item Subjective Numeracy Scale score with a potential range of 3 to 18. The questions were as follows: (1) How good are you at working with fractions? (1 = *not good at all* to 6 = *extremely good*); (2) How good are you at figuring out how much a shirt will cost if it is 25 percent off? (1 = *not good at all* to 6 = *extremely good*); and (3) How often do you find numerical information to be useful? (1 = *never* to 6 = *very often*). The interior responses (between *never* and *very often*) were labeled with numbers 2 through 5. We assessed perceived numeracy because the major alone can be inadequate for discerning students' academic orientation and skills, such as a history major who is also on a premedical track but would otherwise be classified and analyzed as a humanities student. We expected that students with high numeracy scores would generally favor STEM-oriented terms.

Finally, Item 12 offered students the option of submitting their mobile phone number for possible recruitment into a follow-up focus group. The project team exhausted available time and resources before implementing the focus groups, but approximately 20 percent of respondents submitted numbers that were helpful for detecting and eliminating duplicate responses before being stripped from the data to preserve anonymity.

We purposefully did not solicit students' racial or ethnic categories. We aimed to make the survey a quick, and possibly fun, experience for participants. Miami and San Diego are majority–minority cities where students' racial and ethnic identities often do not always align with traditional census race and ethnicity categories. Given the prevalence of identity politics in the popular media and on our university campuses during the study period, we did not want to include any item that might make students uncomfortable. We acknowledge this omission to be a key study limitation given that race and ethnicity shape access to higher education and play a role in undergraduate major selection (e.g., Ma 2009), with geography historically struggling to attract undergraduates from underrepresented groups (Estaville, Akiwumi, and Montalvo 2009).

We created a separate Qualtrics survey file for each of the four participating institutions to facilitate easier monitoring of incoming surveys and to customize the local place name (Item 3) and list of majors (Items 6 and 7). After the data were cleaned, extracts from the four files were combined into one data file for analysis.

Respondent Recruitment

The survey was implemented on a rolling basis by the four institutions, beginning with UM, between September 2018 and March 2019. Participants at each institution were recruited person-to-person and in class settings and in quotas proportional to each institution's undergraduate population by individual school or college (see Supplemental Material, Tables S.1–S.4, for the sampling frame). We could not perform an a priori sample size calculation for detecting the difference between means because of the lack of comparison studies that would normally provide an estimate of population variance. Given the total undergraduate enrollment of 85,048 across the four participating institutions, we set a 5 percent sample target of 4,252 participants. This enabled us to detect differences between means (from our six-point scale) as small as 0.09 to 0.10 for two comparison groups (e.g., male vs. female).

We anticipated a potentially unbalanced sample across institutions and the necessity of implementing survey weights to analyze the data. Therefore, although the official samples quotas were proportional to school or college enrollments, we did our best to mirror institutional distributions across class year and gender in our sample to mitigate the need for sample weights across these student characteristics.

The principal investigator (PI) at each university recruited and trained a small group of students to solicit respondents in person. The PIs often participated in the survey work alongside the student team. Student recruiters were given mobile tablets and sent to popular areas of campus to recruit participants using a standard approach script (see Supplemental Material) and a supply of granola or fruit bars to offer as incentives for participation. Prospective participants were generally approached at tables in public campus settings where they were studying or eating, rather than intercepted while walking. At the onset of data collection at each site, student recruiters sought any interested undergraduates as participants. Each PI would monitor the distribution of responses daily or weekly in Qualtrics and iteratively steer the survey team to target participants needed to fulfill school or college quotas or demographically rebalance the sample (e.g., first-year business majors or female engineering majors).

Site PIs also arranged visits to lecture-format classes to target specific student profiles, and this technique became more important as a site approached its overall sample targets for each school or college. With the instructor's permission, site PIs projected a standard slide on the screen (Supplemental Material) and used a standard script to introduce the project and solicit student participation to minimize any bias in the responses (Supplemental Material). These visits typically occurred in the ten minutes preceding the official class start time to avoid using much of the instructor's teaching time. Although this meant that only a fraction of students (often fewer than half) enrolled in the course were typically present, this approach was effective in helping to meet the stratified sample targets.

We explicitly did not recruit participants via digital media (e-mail, messaging services, or social media) due to traditionally lower response rates, higher noncompletion rates, and lower data quality associated with these strategies (Gunter et al. 2002). The presence of a survey solicitor or faculty member, and especially the snack bar incentives, improved survey efficiency, the subsequent completion rate, and overall data quality.

Statistical Analyses

The key words solicited for a hypothetical free elective course were used to create word clouds using a free online word cloud tool available at www.wordart.com. These visualizations were used to qualitatively examine the terms submitted by students and how these might differ by institution.

The primary outcome variables of this study were the mean ratings (range = 1–6) for each of the thirty key words and thirty-seven department primitives. We generally interpreted a mean above 3.5 as favorable (net attractive) and a mean below 3.5 as unfavorable (net unattractive). We present these means and standard deviations in ranked order, weighted by institution and college or school, by institution (and in aggregate), gender, high school location (U.S. vs. non-U.S.), self-rated numeracy (above vs. below the institutional median), whether the student has taken a university-level geography course, class standing, knowledge area of the primary major (reclassified as arts and humanities, people and society, or STEM), and primary major type (reclassified as arts and humanities, business, communication, education, engineering, natural sciences, nursing and health, social sciences, or undeclared). We employed *t* tests to assess the difference in mean scores between groups (e.g., male vs. female) in IBM SPSS Statistics 25, using a Bonferroni correction for multiple comparisons when there were more than two comparison groups, using the statistical significance threshold of $\alpha = 0.05$. We were not interested in the relative ranks of the terms in each list, per se, but rather how each student characteristic affected the weighted differences in ratings.

We also ran multivariable weighted regression models of the student ratings for each key word and department primitive to see which student characteristics were most strongly associated with each term or phrase. We computed weights by multiplying an institutional weight (the institution's 5 percent target divided by the actual institutional sample size) by a college-level weight (each institution's college or school target divided by the actual college or school sample size). We fitted two-level tobit regression models that controlled for institution as a mixed effect. Tobit regression modifies the likelihood function to account for censoring of scaled dependent variables like our six-point rating scale (Austin, Escobar, and Kopec 2000). We specified all lower limit censoring at one and the upper limit to six. In these models, the mean rating of a given term was the dependent variable, and gender, high school location, numeracy, class standing, whether a geography course was ever taken, and area of knowledge were the independent variables. We used Stata v16.0 for all multivariable analyses and again interpreted our results with a statistical significance threshold of $\alpha = 0.05$.

Funding and Ethical Review

The study was supported by the lead author and internal departmental resources at each participating institution. SDSU received additional support from the California Geographic Alliance to pay student researchers. No other external funding was provided. The study was approved by the respective institutional review boards at UM, MSU, SDSU, and CCU.

Results

Sample Characteristics

The final analytical sample size was 4,388 undergraduates, a completion rate of 90.8 percent. Of 4,835 initiated surveys, 6 declined consent, 340 responses were excluded as incomplete, 93 graduate student responses were excluded, and 8 were excluded as duplicates via phone number matching (Table 1). The proportion of surveys conducted in a class versus nonclass setting were, in aggregate, approximately even for the three universities where we informally tracked this (excluding MSU). To maximize operational speed, however, the data were not collected in a way that allowed us to assess differences in ratings or demographics between recruitment techniques. That said, we have no reason to expect any bias attributable to surveying in a class versus nonclass setting. The sampling frame for each institution and subsequent representativeness of the sample across student characteristics is presented in Supplemental Material, Tables S.1 through S.4. Median survey completion time was five minutes and eighteen seconds.

The distribution of student characteristics for our analytical sample is presented in Table 2. Overall, participants were nearly evenly distributed across class years (first year = 26.2 percent, second year = 28.0, third year = 25.0, fourth year = 20.8), and 56.2 percent were female. Nearly a quarter (24.2 percent) had previously taken a geography course, 10.8 percent were international students (i.e., attended a

Table 2. Descriptive characteristics of study participants by institution

Characteristic	UM	CCU	MSU	SDSU	All
Class standing (%)					
First year	24.3	22.2	22.9	41.1	26.2
Second year	30.5	26.5	27.6	25.9	28.0
Third year	25.0	29.3	26.0	19.6	25.0
Fourth year	20.2	22.0	23.5	13.5	20.8
Gender: Female (%)	58.4	54.7	53.7	60.2	56.2
Non-U.S. high school (%)	12.6	2.8	13.1	6.9	10.8
Ever taken geography class (%)	16.1	37.3	22.4	33.0	24.2
Mean subjective numeracy score	13.8	12.8	14.1	13.4	13.8
Major type (%)					
Arts and humanities	8.1	7.2	2.9	6.5	5.4
Business	22.8	22.4	19.7	20.9	21.1
Communication	8.9	9.4	6.7	7.2	7.7
Education	0.8	7.4	1.7	9.7	3.4
Engineering	11.1	3.2	20.4	13.0	14.7
Natural sciences	17.8	20.2	28.0	10.8	21.5
Nursing and health	11.4	13.8	5.0	15.5	9.5
Social sciences	16.4	15.6	13.8	12.5	14.5
Undeclared	2.7	1.0	1.8	3.7	2.3
Area of knowledge (%)					
Arts and humanities	10.2	7.3	3.4	6.8	6.2
People and society	39.4	37.5	29.4	38.2	34.5
STEM	50.3	55.2	67.2	55.0	59.3

Note: UM = University of Miami; CCU = Coastal Carolina University; MSU = Michigan State University; SDSU = San Diego State University; STEM = science, technology, engineering, and math.

non-U.S. high school), and the mean numeracy score was 13.8 out of a possible maximum of eighteen. There were modest institutional differences across these characteristics with two notable exceptions. There were higher rates of international students from UM (12.6 percent) and MSU (13.1 percent) than from CCU (2.8 percent) and SDSU (6.9 percent) and higher rates of students ever taking a geography class at CCU (37.3 percent) and SDSU (33.0 percent) than at MSU (22.4 percent) and UM (16.1 percent).

Fewer than 20 percent of participants submitted a secondary major, so we used the primary major in all analyses. Overall, most participants' major types were natural sciences (21.5 percent), business (21.1 percent), engineering (14.7 percent), or social sciences (14.5 percent), with smaller numbers of nursing and public health (9.5 percent), communication (7.7 percent), arts and humanities (5.4 percent), education (3.4 percent), and undeclared (2.3 percent). Just fifty-nine participants (1.3 percent) were geography majors. The distribution of majors reflected the academic emphasis (and sometimes nonexistence of programs) at each institution. For example, MSU is known for applied sciences and had a much lower rate of arts and humanities majors (2.9 percent) than the other institutions. UM and MSU have much smaller teaching credentialing programs than CCU and SDSU and thus had lower representation of education majors. CCU has an engineering major, rather than a college of engineering (as do UM, MSU, and SDSU) and thus has far fewer engineering participants (3.2 percent). Likewise, MSU lacked an undergraduate public health program and thus had far fewer nursing and health majors (5.0 percent). Majors were also reclassified into three areas of knowledge: arts and humanities (6.2 percent), people and society (34.5 percent), and STEM (59.3 percent).

Free Elective Word Clouds

The word clouds for all free elective responses, and by institution, are presented in Figure 2. Our subjects of interest, geography (sixty-one mentions), environment (ninety-three), and sustainability (thirty-seven), were very far down the list but did appear. The most frequent responses reveal broad interest in the arts and humanities—there were over a thousand combined mentions of art, music, history, and film—in contrast with recent data summarizing the most common undergraduate majors. The National Center for Education Statistics 2017 *Digest of Education Statistics* reported a summary of 1,895,000 bachelor's degrees conferred in 2014–2015 (Snyder, de Brey, and Dillow 2019). The most common degrees were business (approximately 364,000), health professions (216,000), social sciences and history (167,000), psychology (116,000), biological and biomedical sciences (110,000), engineering (98,000), visual and performing arts (96,000), and education (92,000). Students at our study sites apparently still yearn for the arts and humanities, even if they are infrequently majoring in these subjects.

Key Word and Department Primitive Ratings

We began exploring the student ratings by comparing the grand means of the aggregated ratings for all thirty-seven course title key words and all thirty department name primitives by student characteristics (Supplemental Material, Table S.5). The grand mean for all key words was 3.74 (on the scale of

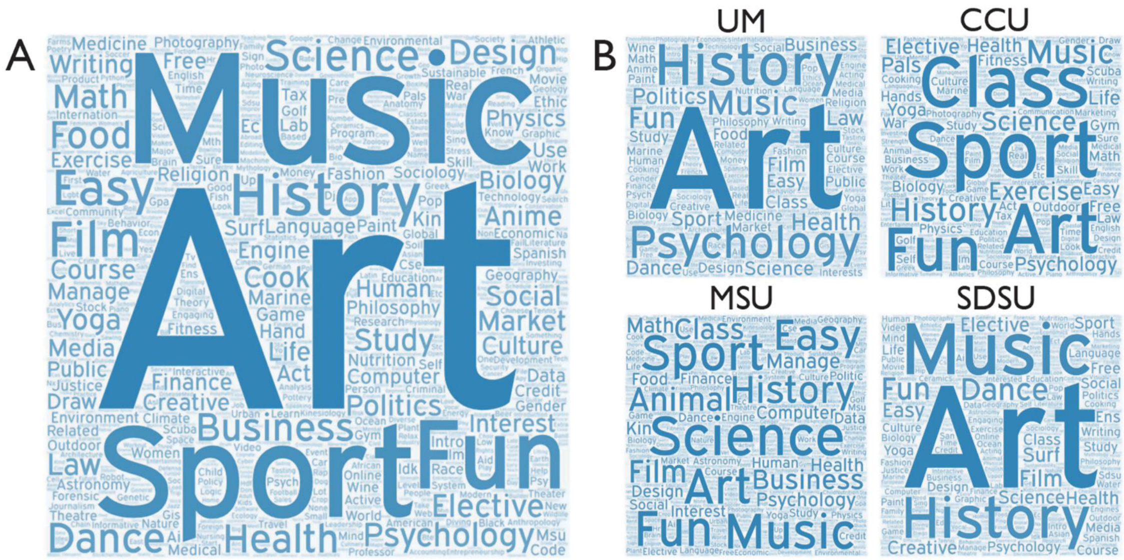

Figure 2. Word clouds of 4,388 free text responses regarding search terms for a free elective course for (A) all responses (unweighted by institution) and (B) participating institutions.

1–6), and the grand mean for all department primitives was 3.58; these means can be interpreted as a baseline for comparing the overall mean rating of any single key word or primitive. We observed that the grand means increased by class year and were higher for males, students who had previously taken a geography class, students with numeracy above their institution's median, and STEM and social sciences majors. These grand mean trends were generally consistent with our expectations and suggested substantial variation in ratings at the key word and department primitive level.

Overall and Institution Ratings. The ranking of thirty-seven course title key words overall and by institution is presented in Table 3, and most key words were ranked favorably. For all four institutions combined, *crime* was the highest rated key word (M = 4.34, *SD* = 1.24), followed closely by *culture* (M = 4.33, *SD* = 1.27), *social media* (M = 4.29, *SD* = 1.31), *technology* (M = 4.24, *SD* = 1.27), and *human rights* (M = 4.24, *SD* = 1.30). The rest of the top ten was rounded out by *health*, *society*, the custom *local place name* option, *environment*, and *digital*.

The lowest rated key word was *geomorphology* (M = 2.94, *SD* = 1.28), followed by *geographic information systems* (M = 3.07, *SD* = 1.36), *spatial analysis* (M = 3.13, *SD* = 1.36), *geopolitics* (M = 3.22, *SD* = 1.41), and *hydrology* (M = 3.22, *SD* = 1.32). The bottom ten also contained (again in reverse order) *geoscience*, *big data*, *analytics*, *economics*, and *regional*. The key word *geography* (M = 3.43, *SD* = 1.32) was rated significantly lower than *environment* (M = 4.12, *SD* = 1.25) and *sustainability* (M = 3.99, *SD* = 1.31). Students were surprisingly consistent across the four universities; the key words that appeared in the top ten, middle, and bottom ten of the overall rankings were generally stable across institutions.

The ranking of thirty departmental name primitives overall and by institution is presented in Table 4, and most primitives were ranked favorably. *Technology* was the highest rated primitive (M = 4.09, *SD* = 1.28), followed by *society* (M = 3.97, *SD* = 1.27), *environment* (M = 3.88, *SD* = 1.30), *environmental sustainability* (M = 3.85, *SD* = 1.36), and *sustainability* (M = 3.84, *SD* = 1.32). The rest of the top ten was rounded out by *development*, *environmental studies*, *urban sustainability*, *global studies*, and *environmental sciences*.

The lowest rated primitive was *geoinformation science* (M = 3.12, *SD* = 1.28), followed by *geospatial sciences* (M = 3.15, *SD* = 1.30), *geographic information science* (M = 3.19, *SD* = 1.28), *spatial sciences* (M = 3.22, *SD* = 1.27), and *geosciences* (M = 3.26, *SD* = 1.27). The bottom ten also contained *regional planning*, *geographical sciences*, *regional studies*, *geography*, and *urban systems*. Students were again consistent across universities, with the same items generally falling into the top, middle, and bottom tertiles.

There were also trends among words that appeared in multiple primitive options, such as *urban*, *environment*, *sustainable*, *science*, and the *geo-* prefix. The mean ratings were highest across the five

Table 3. Ratings of thirty-seven course title key words by institution, weighted by institution and college or school

	UM			CCU			MSU			SDSU			All		
	Item	*M*	*SD*	Item	*M*	*SD*	Item	*M*	*SD*	Item	*M*	*SD*	Item	*M*	*SD*
Top 10	Crime	4.46	1.29	Crime	4.60	1.22	Culture	4.30	1.25	Crime	4.42	1.16	Crime	4.34	1.24
	Culture	4.44	1.27	Social media	4.44	1.39	Technology	4.26	1.26	San Diego[a]	4.37	1.13	Culture	4.33	1.27
	Miami[a]	4.35	1.25	Culture	4.42	1.29	Health	4.20	1.29	Social media	4.36	1.27	Social media	4.29	1.31
	Society	4.32	1.27	Health	4.29	1.29	Human rights	4.20	1.32	Culture	4.31	1.27	Technology	4.24	1.27
	Social media	4.31	1.37	Human rights	4.24	1.34	Social media	4.16	1.29	Technology	4.29	1.22	Human rights	4.24	1.30
	Human rights	4.22	1.39	Society	4.20	1.30	Society	4.16	1.23	Human rights	4.28	1.25	Health	4.21	1.28
	Health	4.21	1.39	Environment	4.12	1.39	Crime	4.15	1.29	Health	4.20	1.24	Society	4.18	1.25
	Global	4.20	1.31	Technology	4.09	1.32	Environment	4.10	1.25	Environment	4.18	1.17	Local place name[a]	4.15	1.26
	Technology	4.13	1.38	Global	4.03	1.37	Climate change	4.06	1.36	Society	4.14	1.26	Environment	4.12	1.25
	Cities	4.01	1.30	Food and agriculture	4.01	1.35	Sustainability	4.03	1.31	Digital	4.14	1.21	Digital	4.05	1.26
Middle (17)	Environment	4.01	1.39	Development	3.98	1.26	Digital	4.00	1.26	Climate change	4.05	1.32	Climate change	4.01	1.37
	Development	3.96	1.29	Water	3.98	1.34	Michigan[a]	3.97	1.29	Sustainability	4.01	1.25	Global	4.00	1.27
	Digital	3.96	1.34	Digital	3.97	1.31	Global	3.96	1.29	Water	3.97	1.18	Sustainability	3.99	1.31
	Urban	3.94	1.30	Conservation	3.94	1.36	Development	3.96	1.24	Global	3.96	1.20	Development	3.94	1.25
	Sustainability	3.91	1.41	Medical	3.91	1.48	Conservation	3.90	1.28	Development	3.91	1.24	Water	3.90	1.26
	Climate change	3.89	1.47	Cities	3.89	1.28	Water	3.83	1.27	Conservation	3.87	1.26	Conservation	3.87	1.30
	Immigration	3.86	1.38	Sustainability	3.88	1.39	Cities	3.83	1.22	Medical	3.86	1.38	Medical	3.84	1.46
	Medical	3.82	1.60	Climate change	3.84	1.49	Medical	3.82	1.49	Immigration	3.86	1.30	Cities	3.84	1.23
	Water	3.81	1.36	Urban	3.81	1.31	Immigration	3.82	1.24	Urban	3.84	1.21	Immigration	3.83	1.30
	Conservation	3.75	1.43	Population	3.79	1.27	Urban	3.78	1.23	Food and agriculture	3.81	1.21	Urban	3.83	1.24
	Population	3.73	1.27	Immigration	3.72	1.41	Gender	3.75	1.41	Cities	3.79	1.21	Food and agriculture	3.79	1.29
	Food and agriculture	3.72	1.37	South Carolina[a]	3.66	1.41	Food and agriculture	3.73	1.32	Population	3.64	1.22	Population	3.70	1.23
	Gender	3.66	1.53	Gender	3.66	1.54	Population	3.73	1.21	Gender	3.63	1.43	Gender	3.68	1.45
	History	3.57	1.56	Mobility	3.64	1.23	Mobility	3.59	1.19	Mobility	3.58	1.19	Mobility	3.57	1.21
	Geography	3.42	1.36	History	3.63	1.62	History	3.58	1.47	Transportation	3.55	1.22	Transportation	3.47	1.28
	Mobility	3.40	1.28	Geography	3.56	1.41	Transportation	3.46	1.29	Geography	3.39	1.24	History	3.46	1.50
	Economics	3.36	1.53	Transportation	3.49	1.35	Geography	3.45	1.34	Hydrology	3.30	1.29	Geography	3.43	1.32
Bottom 10	Geopolitics	3.30	1.48	Regional	3.42	1.27	Analytics	3.44	1.37	History	3.28	1.46	Regional	3.32	1.19
	Transportation	3.26	1.36	Geoscience	3.25	1.39	Big data	3.44	1.45	Regional	3.25	1.11	Economics	3.28	1.47
	Regional	3.25	1.29	Hydrology	3.24	1.39	Regional	3.40	1.22	Geoscience	3.20	1.30	Analytics	3.25	1.40
	Analytics	3.19	1.50	Geographic information systems (GIS)	3.23	1.45	Economics	3.39	1.43	Geopolitics	3.18	1.41	Big data	3.24	1.43
	Big data	3.12	1.50	Economics	3.17	1.47	Geoscience	3.30	1.31	Economics	3.16	1.47	Geoscience	3.23	1.32
	Geoscience	3.08	1.35	Analytics	3.14	1.46	Geopolitics	3.28	1.39	Spatial analysis	3.13	1.36	Hydrology	3.22	1.32
	Hydrology	3.01	1.34	Big data	3.07	1.37	Hydrology	3.22	1.31	Big data	3.12	1.37	Geopolitics	3.22	1.41
	Spatial analysis	3.01	1.42	Spatial analysis	3.07	1.36	Spatial analysis	3.19	1.35	Analytics	3.11	1.36	Spatial analysis	3.13	1.36
	Geographic information systems (GIS)	2.97	1.36	Geopolitics	3.02	1.39	Geographic information systems (GIS)	3.17	1.33	Geographic information systems (GIS)	2.98	1.37	Geographic information systems (GIS)	3.07	1.36
	Geomorphology	2.82	1.33	Geomorphology	2.99	1.35	Geomorphology	2.97	1.29	Geomorphology	2.94	1.24	Geomorphology	2.94	1.28

Note: Ratings ranged from 1 to 6 where 1 = *extremely unattractive* and 6 = *extremely attractive*. UM = University of Miami; CCU = Coastal Carolina University; MSU = Michigan State University; SDSU = San Diego State University.

[a]Local place name varied by institution: Miami (UM), South Carolina (CCU), Michigan (MSU), and San Diego (SDSU).

Table 4. Ratings of thirty department name primitives by institution, weighted by institution and college or school

	UM			CCU			MSU			SDSU			All		
	Item	M	SD	Item	M	SD	Item	M	SD	Item	M	SD	Item	M	SD
Top 10	Society	4.08	1.29	Society	4.04	1.29	Technology	4.08	1.29	Technology	4.13	1.22	Technology	4.09	1.28
	Technology	4.03	1.38	Technology	4.01	1.35	Society	3.93	1.26	Society	3.96	1.26	Society	3.97	1.27
	Global studies	3.84	1.38	Environment	3.94	1.42	Environment	3.88	1.29	Environment	3.92	1.25	Environment	3.88	1.30
	Development	3.76	1.35	Development	3.81	1.31	Environmental sustainability	3.82	1.37	Environmental sustainability	3.92	1.28	Environmental sustainability	3.85	1.36
	Environmental sustainability	3.76	1.43	Environmental studies	3.75	1.41	Sustainability	3.82	1.34	Sustainability	3.92	1.24	Sustainability	3.84	1.32
	Environment	3.74	1.39	Environmental sustainability	3.74	1.46	Development	3.77	1.27	Urban sustainability	3.80	1.26	Development	3.76	1.26
	Sustainability	3.73	1.39	Planning	3.74	1.34	Environmental studies	3.72	1.32	Environmental studies	3.79	1.27	Environmental studies	3.74	1.32
	Urban sustainability	3.73	1.41	Global studies	3.73	1.41	Environmental sciences	3.72	1.31	Global studies	3.74	1.30	Urban sustainability	3.73	1.32
	Environmental sciences	3.65	1.36	Environmental resources	3.72	1.41	Global studies	3.68	1.30	Development	3.73	1.20	Global studies	3.73	1.32
	Environmental studies	3.63	1.41	Environmental sciences	3.71	1.49	Sustainability sciences	3.68	1.34	Sustainability sciences	3.73	1.25	Environmental sciences	3.71	1.30
Middle 10	Urban studies	3.63	1.36	Sustainability	3.68	1.43	Environmental resources	3.67	1.33	Environmental sciences	3.72	1.22	Sustainability sciences	3.68	1.33
	Environmental resources	3.60	1.37	Environmental management	3.68	1.42	Urban sustainability	3.67	1.33	Environmental management	3.72	1.27	Environmental resources	3.68	1.32
	Sustainability sciences	3.58	1.42	Environmental systems	3.68	1.36	Sustainable planning	3.66	1.34	Sustainable planning	3.71	1.27	Environmental management	3.66	1.32
	Sustainable planning	3.58	1.41	Earth sciences	3.67	1.44	Environmental systems	3.65	1.33	Environmental resources	3.70	1.27	Sustainable planning	3.66	1.33
	Urban planning	3.58	1.36	Environmental planning	3.64	1.43	Environmental management	3.62	1.33	Environmental planning	3.70	1.24	Environmental systems	3.64	1.31
	Environmental management	3.54	1.39	Urban sustainability	3.63	1.41	Urban studies	3.61	1.28	Urban studies	3.67	1.23	Urban studies	3.63	1.27
	Urban systems	3.53	1.33	Geography	3.61	1.40	Planning	3.58	1.29	Urban planning	3.67	1.21	Environmental planning	3.62	1.31
	Environmental planning	3.51	1.38	Sustainable planning	3.60	1.40	Environmental planning	3.58	1.33	Environmental systems	3.66	1.26	Urban planning	3.60	1.26
	Environmental systems	3.50	1.38	Sustainability sciences	3.57	1.44	Urban planning	3.55	1.27	Urban systems	3.61	1.22	Planning	3.58	1.28
	Earth sciences	3.45	1.37	Urban studies	3.53	1.32	Earth sciences	3.52	1.32	Planning	3.58	1.24	Earth sciences	3.55	1.31
Bottom 10	Planning	3.42	1.33	Urban planning	3.52	1.32	Urban systems	3.48	1.28	Earth sciences	3.58	1.24	Urban systems	3.53	1.27
	Geography	3.36	1.37	Urban systems	3.42	1.34	Geography	3.35	1.33	Geographical sciences	3.37	1.21	Geography	3.37	1.32
	Regional studies	3.30	1.29	Regional studies	3.37	1.22	Regional studies	3.34	1.21	Regional studies	3.36	1.13	Regional studies	3.35	1.19
	Geographical sciences	3.21	1.33	Regional planning	3.32	1.30	Regional planning	3.29	1.24	Geography	3.33	1.26	Geographical sciences	3.31	1.27
	Geosciences	3.17	1.31	Geographical sciences	3.31	1.35	Geographical sciences	3.29	1.29	Regional planning	3.30	1.14	Regional planning	3.28	1.22
	Regional planning	3.15	1.29	Geographic information science	3.31	1.35	Geosciences	3.29	1.26	Spatial sciences	3.29	1.24	Geosciences	3.26	1.27
	Geographic information science	3.10	1.35	Geosciences	3.25	1.39	Geographic information science	3.21	1.28	Geosciences	3.27	1.23	Spatial sciences	3.22	1.27
	Spatial sciences	3.10	1.32	Geoinformation science	3.19	1.35	Spatial sciences	3.21	1.28	Geospatial sciences	3.18	1.28	Geographic information science	3.19	1.28
	Geospatial sciences	3.09	1.34	Geospatial sciences	3.17	1.38	Geoinformation science	3.14	1.28	Geographic information science	3.16	1.24	Geospatial sciences	3.15	1.30
	Geoinformation science	3.00	1.30	Spatial sciences	3.15	1.29	Geospatial sciences	3.14	1.29	Geoinformation science	3.12	1.24	Geoinformation science	3.12	1.28

Note: Ratings ranged from 1 to 6 where 1 = *extremely unattractive* and 6 = *extremely attractive*. UM = University of Miami; CCU = Coastal Carolina University; MSU = Michigan State University; SDSU = San Diego State University.

primitives containing *sustainability* (M = 3.75, *SD* = 1.33) and the eight containing *environment* (M = 3.72, *SD* = 1.32), slightly less for the four containing *urban* (M = 3.62, *SD* = 1.28), and much lower (and unfavorable) for the nine containing *science* (M = 3.35, *SD* = 1.29) and the six containing the *geo-* prefix (M = 3.23, *SD* = 1.29). In fact, *science* only performed well when preceded by *environment* (i.e., *environmental sciences*) or *sustainability* (i.e., *sustainability sciences*).

Taken together, the ratings of the thirty key words and thirty-seven department primitives revealed that undergraduates strongly prefer simpler, everyday, thematic types of terms to those that sounded more technical or science oriented. There was a striking contrast between top ten rated key words and primitives, representing constructs routinely encountered in high school and popular media, and bottom-rated terms related to constructs or subdisciplines that many adults only encounter through higher education.

Ratings by Student Characteristics

Gender

We observed statistically significant differences by gender for thirty of the thirty-seven course title key words tested (Supplemental Material, Table S.6), with the largest difference observed for the term *gender* itself, which was the lowest rated key word among males (female M = 4.15, *SD* = 1.29; male M = 3.06, *SD* = 1.40; $p < 0.001$). *Culture*, *human rights*, *social media*, *crime*, and *society* were the highest rated terms for females, and *technology*, *digital*, *crime*, *local place name*, and *environment* were highest rated for males. Female key word ratings exhibited more variation than male ratings, because most top ten rated key words were rated statistically significantly higher than they were by males, and all bottom fourteen rated key words were rated statistically significantly lower than they were by males. Males also rated all five key words beginning with *geo-* higher than females did. Despite these differences in magnitude, each gender rated the key words in a similar order, with six in common in the top ten and seven in common in the bottom ten.

We observed statistically significant different ratings for fifteen of thirty department primitives tested (Supplemental Material, Table S.7), with most of those appearing in the bottom tertile for each gender, and rating magnitudes essentially similar in the top two tertiles. Eight of each gender's top ten were the same, as were nine of the bottom ten. For both key words and department primitives, males and females preferred simple terms such as *society*, *environment*, and *sustainability* over technical or science-oriented phrases, with *technology* being the exception.

High School Location

We observed statistically significantly different scores for international student ratings compared to U.S. high school attendees for nineteen of thirty-seven key words and more modest differences for nine of thirty departmental primitives (Supplemental Material, Tables S.8 and S.9). Many of the differences reflect higher international student ratings for STEM-related terms, such as *technology*, *digital*, *big data*, *analytics*, *spatial analysis*, and *geographic information systems*, and are likely shaped by disproportionate numbers of STEM-focused international students from Asia. Other differences reflect higher ratings by U.S. high school attendees for terms associated with global challenges and policies, such as *crime*, *human rights*, *environment*, and *conservation*. For both key words and departmental primitives, international students rated most *geo*-related terms higher.

Prior Geography Course Experience

Students who had previously enrolled in a geography course rated twenty-five of thirty-seven course key words and twenty-nine of thirty department primitives statistically significantly higher than students who had never taken a geography course (Supplemental Material, Tables S.10 and S.11). Clearly geography course experience mattered; this was the strongest effect we observed among the student characteristics assessed. Students who had ever taken a geography course only rated one key word or primitive lower than their counterparts who had never taken a geography course: *medical*. Perhaps students with high affinity for medicine or who aspire to attend medical school are less likely to have taken a geography course (*health* was also not swayed by geography exposure; it had a mean rating of 4.21 regardless of whether the student had taken a geography course).

Numeracy

Students whose self-rated numeracy score was above their institution's median score rated twenty-one of thirty-seven key words and twenty-seven of thirty department primitives statistically significantly higher than students with below-median numeracy (Supplemental Material, Tables S.12 and S.13).

Students with above-median numeracy rated the key words in their top ten and middle bins with similar magnitude, but they generally rated terms in their bottom ten higher. Students with above-median numeracy rated every departmental primitive higher except *society* (above median M = 3.91, *SD* = 1.27; below median M = 4.04, *SD* = 1.26), although *society* was still the fifth most highly rated primitive (and top-rated primitive for below-median numeracy students). The relative order of terms was again very similar for both groups.

Class Standing

Ratings for the entire set of terms taken together increased from first-year to fourth-year students (Supplemental Material, Table S.5), and we observed a similar trend for most of the thirty-seven key words and thirty department primitives. Table S.14 (Supplemental Material) presents the ratings of the course title key words by class standing, and we see that thirty-five of thirty-seven terms are rated lowest by first- or second-year students and thirty-five of thirty-seven are rated highest by third- or fourth-year students. Ratings of department primitives by class standing displayed the same pattern (Supplemental Material, Table S.15): All thirty terms were rated lowest by first- or second-year students and highest by third- and fourth-year students (see Supplemental Material for significance tests). The key word and department primitive ratings by class standing mimic the overall trends.

Among the key words, a typology of four categories of terms emerged that might be worth future study using qualitative methods: incremental increase, decrease, stable, and punctuated increase. Most terms were rated incrementally higher by students from each of the four class years, such as *culture* (M = 4.20, 4.31, 4.42, 4.47) or *sustainability* (M = 3.83, 4.00, 4.04, 4.20). Students increasingly embraced these terms as they learned more about them throughout their undergraduate careers. These differences were generally statistically significant between the first and fourth years (see Supplemental Material for significance tests). The vast majority of departmental primitives also fit the incremental increase pattern. Other terms' ratings decreased over the four years, such as *social media* (M = 4.34, 4.36, 4.26, 4.14) and *crime* (M = 4.37, 4.39, 4.30, 4.26). A few terms were relatively stable across class years, such as *medical* (M = 3.82, 3.77, 3.98, 3.80) and *urban* (M = 3.76, 3.82, 3.90, 3.85), indicating that students might graduate with similar impressions of certain topics as when they began their undergraduate studies. Finally, several terms were rated low by students early on in their undergraduate education and then experienced a punctuated increase in the last year or two, such as *geography* (M = 3.44, 3.26, 3.45, 3.63), *history* (M = 3.42, 3.24, 3.52, 3.77), and *geographic information systems* (M = 3.03, 2.96, 3.04, 3.35). This pattern is consistent with the phenomenon of students finding geography courses late in their undergraduate career but enjoying the content (as evidenced by the higher ratings across the board for students who had previously taken a geography course).

Major Type and Area of Knowledge

The ratings of key words and department primitives by major type are presented in Tables S.16 and S.17 (Supplemental Material). The types of words and phrases that appear in the top ten and bottom ten are consistent with the overall results, but the magnitude of the ratings is often statistically significantly different by major type (see Supplemental Material for significance tests). The major types with the highest ratings for *geography* were social sciences (M = 3.60, *SD*= 1.44) and natural sciences (M = 3.59, *SD* = 1.28), although these were the only major types with a net attractive mean rating (i.e., > 3.50) for *geography*. The major types with the highest ratings for *environment* were natural sciences (M = 4.50, *SD* = 1.19), social sciences (M = 4.20, *SD* = 1.22), and arts and humanities (M = 4.16, *SD* = 1.28), and for *sustainability*, natural sciences (M = 4.30, *SD* = 1.30), social sciences (M = 4.09, *SD* = 1.28), and engineering (M = 3.98, *SD* = 1.32). All major types rated *environment* and *sustainability* as net attractive. Education and undeclared major types yielded the lowest ratings for *environment* and *sustainability*, whereas communication, education, and nursing and health majors rated *geography* the lowest.

For ease of comparison, we also aggregated major types into three areas of knowledge: arts and humanities, people and society, and STEM. People and society majors provided the highest ratings for more than half of the course key words and departmental primitives (Supplemental Material, Tables S.18 and S.19). STEM majors tended to rate technical-sounding and science-oriented terms the highest (e.g., *technology*, *medical*, *big data*, anything ending in *sciences*). Arts and humanities majors tended to rate social terms the highest (e.g., *culture*, *human rights*, *history*) and notably rated most of the departmental primitives as net unattractive and lower than STEM and people and society majors (see Supplemental Material for significance tests).

Multivariable Models

We present the results of our multivariable multilevel tobit regression models of the course key word and departmental name primitive ratings in Table 5. The analytical sample size was 4,259 students, which excluded 129 study participants who either had specified their major as undeclared (and thus could not be assigned an area of knowledge) or who declined to provide their gender. The full tables with measures of association and uncertainty for each model are available in the Supplemental Material.

We observed at least one statistically significant association between one of the six student characteristics and every key word and department primitive we tested except for the key word *urban*. The characteristics most commonly associated with the key words and primitives were numeracy score and gender. The association with numeracy score was positive in every case except for the key word *social media*, whereas the associations with gender were nearly evenly split between male and female. We thus used gender as a basis for grouping the key word and departmental primitives in Table 5, which helped us identify patterns.

For both key words and departmental primitives, the first groups of terms in Table 5 included those that begin with the *geo-* prefix or that sound technical or computational (e.g., *spatial analysis*, *hydrology*, *analytics*, *big data*, *technology*, *spatial sciences*, etc.). High ratings of these terms tended to be strongly associated with males, having attended a non-U.S. high school, and higher numeracy scores. Prior geography course experience, which had the strongest unadjusted associations with the key words and primitives, was more often associated with the *geo-* prefix departmental primitives than key words in the multivariable analyses. When prior geography course experience was statistically significant, the association was always positive except for two terms: *technology* and *digital*. Prior geography course experience was not significantly associated with several geography-oriented terms such as *geographic information systems*, *spatial analysis*, and *geospatial sciences* or with *hydrology*, *analytics*, and *big data*, among many others.

The next groups of terms in Table 5 tended to be more social science–oriented key words and primitives that were strongly associated with females and, to a lesser extent, attending a U.S. high school. These included *culture*, *crime*, *gender*, *health*, *society*, *global studies*, and anything beginning with *environment*. These types of key words and primitives—especially those beginning with *environment*—were more commonly associated with prior geography course experience, and often higher numeracy scores.

A third group of terms, generally related to *urban*, *sustainability*, and *planning* themes, was generally not associated with gender and tended to be associated with some combination of higher numeracy scores, geography course experience, and higher class standing.

Discussion

This study assessed how undergraduates at four universities rated key words and department primitives commonly used by U.S. programs in geography, environment, and sustainability using a low-cost methodology that can be replicated easily by other institutions and in other settings. We found that students provided the highest ratings to simple, lay terms such as *environment*, *society*, *technology*, *crime*, and *culture* and the lowest ratings to more technical-sounding and science-oriented terms such as *spatial analysis*, *geomorphology*, and *geographic information systems*. These ratings were consistent across institutions from different U.S. regions. We observed that simpler terms and those related to environment and sustainability were rated significantly higher than geography-related jargon. Terms reflecting the "sciencing" of geography were rated particularly low. Exposure to geography courses did matter, because students who had previously enrolled in a geography course were more likely to rate almost all of the tested terms higher than those who had no geography course experience. Finally, we observed disparities in student ratings across several student characteristics, and these disparities revealed opportunities for geography, environment, and sustainability programs to engage in more targeted recruiting efforts of students who rate these fields the highest and lowest. We discuss each of these key findings in turn.

Keep It Simple, Stupid

We consistently observed, whether in aggregate or stratified ratings and across institutions, that students prefer simple non-academic-sounding terms. At first

Table 5. Summary of multilevel tobit regression models of course key word and department primitive ratings by student characteristics, with students clustered by institution, and weighted by institution and college or school

					Area of knowledge		
	Class standing[a]	Male[b]	U.S. high school[c]	Geography course taken[d]	People and society[e]	STEM[e]	Numeracy score
Course key words							
Geographic information systems (GIS)	+	+++	−−−			+	+++
Geography		+++		+++			+++
Geomorphology		+++	−−−	++			+
Geopolitics		+++		+++			
Geoscience		+++	−−−	+		+++	+++
Spatial analysis	+++	+++	−−−				+++
Hydrology	++	+++				+	+++
Analytics		+++	−−−		++	+++	+++
Big data	+	+++	−−−		+++	+++	+++
Economics	−	+++	−−−				+++
Technology	+	+++		−−			+++
Regional		+++		+			
History	+	+++		+++		−	
Transportation		+++		++	++	++	+++
Mobility	+	++			++		+++
Digital	+++	+	−−−	−−−	++	−−−	+++
Climate change	+++	−−−		+++		+++	+++
Crime	−−	−−−	+++				
Culture	+++	−−−		++		+++	
Environment		−−−	+	+++			
Gender	+	−−−				+++	++
Health	+++	−−−	++		+++	++	
Medical	++	−−−	++		+++	+++	+
Human rights		−−−	++			−−−	
Immigration		−−−				−−−	+
Social media	−−	−−−	−−−		+++		−−−
Society		−−−	+			−−	
Conservation		−−	+++	+++			++
Sustainability	+	−−		+			+++
Water		−−	+++			++	
Global		−		++			+++
Cities			+			−	+
Development	+++				++	+	+++
Food and agriculture	+			+++			
Population				+++		−	
Urban							
Local place name					+	++	
Department name primitives							
Geographic information science		+++	−−−	+		++	+++
Geographical sciences		+++		+++			+++
Geography		+++		+++			+++
Geoinformation science	+	+++	−−	++	+	++	++
Geosciences		+++	−−−	+++		+++	+++
Geospatial sciences	+	+++	−				+++

(Continued)

Table 5. (*Continued*).

	Class standing[a]	Male[b]	U.S. high school[c]	Geography course taken[d]	Area of knowledge: People and society[e]	Area of knowledge: STEM[e]	Numeracy score
Regional planning	+++	+++		+++			++
Spatial sciences		+++	– –	+		+	+++
Technology	+	+++				+++	+++
Earth sciences				+++		++	
Environment	+++	– –	+	+++		+++	++
Environmental management	+++			+++	+		+++
Environmental planning	++			+++			+++
Environmental resources	+			+++		+++	+++
Environmental sciences	+++	–	+	+		+++	+++
Environmental studies		–	++	+			+++
Environmental sustainability	+++	–		++			+++
Environmental systems	+			+		++	+++
Society	+++	– – –	+++			– –	
Global studies		– –		++			+++
Planning	+++			++	++	+	
Development				+	++		+++
Regional studies			–	+			+++
Sustainability				+++		+	+++
Sustainability sciences	+++					++	+++
Sustainable planning	+++			++			+++
Urban planning	++			+			+++
Urban studies		–		++	+		+
Urban sustainability	+++			+			+++
Urban systems							+++

Note: $N = 4,259$. STEM = science, technology, engineering, and math. The symbols + and – denote positive and negative associations, and the number of symbols denotes the significance level: $^{+}p < 0.05$, $^{++}p < 0.01$, $^{+++}p < 0.001$. For full regression results, see Supplemental Material.
[a]Class standing is treated as a continuous measure (range = 1–4).
[b]Comparison group is female.
[c]Comparison group is non-U.S. high school.
[d]Comparison group is never taken geography course.
[e]Reference category is arts and humanities.

glance this finding might be attributed to students generally having lower knowledge of academic disciplinary terminology when they enter the university than when they graduate. This point is supported by the finding that most key words and department primitives were rated highest by fourth-year students. Some key words, however, did not experience an increase in ratings by class standing, and the same terms were generally the lowest rated by students of all class years. In other words, certain terminology does not become more attractive with age or education and should be recognized as the jargon it is. In addition, whereas university faculty members might express strong feelings about the pedagogical difference between, say, environmental science and environmental studies, undergraduates rated *environmental studies* ($M = 3.74$) and *environmental science* ($M = 3.71$) virtually the same.

We underscore this point with an anecdote from the UM pretest of focus group scripts that were not implemented due to time and resource constraints. In these pretests, students who had already completed the survey were first asked to mark the most and least attractive terms from alphabetized versions of the two term lists (to assess their responses relative to the aggregate survey findings). Then we asked the students to use the two lists to respectively assemble the most interesting-sounding course title and degree name. A first-year female engineering student suggested *spatial planning technology*, and the first-year female architecture student beside her agreed that this sounded great. Stunned, the investigator probed what was meant by *spatial planning technology*; the student proceeded to describe GIS and did not know that this was already a formal academic subject. This anecdote highlights the danger of jargon; the term *geographic information system* was coined in 1968 to describe a niche type of database system (Tomlinson 1968), not a university course title. Although geographic information system was among the lowest rated terms we tested, GIS still bewilders and inspires undergraduates around the nation when they see it. Academic jargon should thus be periodically reassessed with humility but with recognition that course titles such as Exploring the World with Google Earth might risk being perceived as lacking rigor or comparable to offerings on YouTube or at one's local library, thus undermining the perceived value of the geography degree.

The mechanisms used to implement new language within universities is important, because jargon can appear on program and faculty Web sites and in course titles and descriptions that might also appear on Web sites, in the registration system, and in a university's undergraduate bulletin. For example, in 2017 SDSU's Department of Geography began pairing their department name with the tagline "Environment, Society, and Technology" on their Web site's home page and on colorful pop-up banners that greet students entering the department's physical space. Fortunately, these terms turned out to be the top three rated departmental primitives among SDSU study participants (and all participants), and all three terms finished among the top ten rated course key words. SDSU seems to really know their students, and perhaps the marketing campaign successfully activated student interest in these topics. Are these terms prominent elsewhere on departmental Web pages, though, and, more important, in course titles and descriptions (i.e., searchable fields) in the bulletin, which are often the primary ways that students search for courses? When undergraduate advisors from cognate disciplines, first-year student advisors, and transfer student advisors think about the Department of Geography, do they think "Environment, Society, Technology"? Departments seeking to streamline or simplify their campus presence might need to go this extra mile to increase visibility and understanding across the campus community. Outreach to the campus advising community is vital, and direct engagement with students can be coordinated in creative ways, such as during the evening hours through on-campus housing.

Maybe "Science" Isn't Selling Geography

Our results revealed that geography-related jargon is being badly outcompeted by environment- and sustainability-related language. This is consistent with the widespread renaming and rebranding of geography departments reported by Frazier and Wikle (2017), particularly the ongoing trend of reorienting toward these very terms. The other major rebranding strategy, though, has been the "sciencing" of geography department names into departments of *geographical sciences*, *geoscience*, *geographic information science*, *geospatial sciences*, and *geoinformation science*. These phrases were consistently rated as net unattractive and lower than *geography* (and almost everything else tested) on our scale. It is unclear whether departments that have adopted science-oriented names have experienced different enrollment patterns in the years since being renamed; this warrants a closer look on an institution by institution basis. Our results suggest that geography programs might be taking an unnecessary risk by switching to science-based nomenclature if undergraduate recruiting and enrollments are a priority.

The generally low ratings for primitives containing *science*, except when preceded by *environment* or *sustainability*, were surprising given the shifting emphasis toward STEM education in K–12 education and recent increases in STEM majors and funding opportunities among U.S. undergraduates. These results were consistent with the humanities-heavy key words that dominate the word clouds and with the very poor ratings for terms like *big data* and *analytics*. Future research might help us understand whether this represents a quiet backlash to so much of students' lives being STEM related or digital or whether STEM students from majors with rigorous course requirements, if given the option, would simply seek more non-STEM electives. Perhaps today's students—who disproportionately grow up on social media—are looking for inspiration beyond the digital, or perhaps they just do not yet understand terms like *big data* that are trending on many university campuses. Either way, the everyday jargon of PhD holders seems incompatible with that of young adults.

There is also the possibility that the low ratings of science-related terms are partially attributable to the cultural assault on science—particularly as embraced by the current presidential administration (J. Carter, Desikan, and Goldman 2019)—that receives so much attention in the popular media. This could be especially dangerous for a generation who purportedly spends significant time online and is more likely to consume news from social media sources than from traditional sources. Undergraduate perceptions of scientific language appear to be a compelling topic for future higher education research.

Geography Exposure Matters

Students who had previously enrolled in a geography course rated almost every tested term higher, and these were social, environmental, and scientific terms that we want our undergraduates to rate highly if they are to improve the world they inherit. This finding would seem to bode well for student learning outcomes associated with geography, environment, and sustainability courses, regardless of whether students are declaring these majors. This finding reinforces the importance of these types of programs reaching out to students earlier in their careers, as enrollment in a geography course was often associated with increases in key word and department primitive ratings even after adjusting for other student characteristics.

The discipline of geography should consider capitalizing on this strength by demonstrating these differences across a broader set of academic contexts. At the national level, our findings represent opportunities for curricula to resonate with themes that continue to shape higher education, including technology, globalization, and sustainability (Erickson 2012; Nellis 2017). At the local level, more comprehensive findings about the manner in which geography coursework improves perceptions of important social constructs, such as those related to the United Nations Sustainable Development Goals, society's grand challenges, or "wicked problems" such as climate change or pandemics, could contribute much toward helping reestablish geography in K–12 education. It would be particularly strategic to emphasize these connections given Generation Z's predisposition toward social justice and community engagement (Seemiller and Grace 2017). This is also particularly important in light of the AAG's role in helping Advanced Placement (AP) Human Geography become one of fastest growing AP programs in U.S. high schools. Although this might seem like a very positive development for the discipline of geography, many worry that it has become a recent contributor to declining geography enrollments nationwide (Kaplan 2019b).

Despite being the fastest growing AP course in the United States (Kaplan 2019a), AP Human Geography is often taught to ninth- and tenth-graders by social science teachers with limited geography training and no curricular mandate to integrate geospatial technologies. As a result, many students are exposed to a watered-down view of geography, often with no GIS content. Students then move on to other fields with a "been there, done that" perspective on geography, often with no additional opportunities to study geography before high school graduation. As a result, it is possible that some students perceive geography as less rigorous because it was something they studied when they were fifteen years old. It is also possible that students perceive human geography to be *too* rigorous; in 2019 approximately half of AP Human Geography test takers effectively failed the exam with a score below three, the minimum for receiving college credit (Kaplan 2019a). Either way, lackluster high school geography exposure might impede the path to game-changing undergraduate geography exposure. The AAG has long recognized the importance of the manner in which geography is presented in high schools, dating back to the High School Geography Project in the 1960s (Patton et al. 1970; Helburn 1998), and the discipline needs to continue studying the evolving effects of AP Human Geography.

Opportunities

The word clouds revealed substantial undergraduate elective interest in the arts and humanities.

Although we are not positioned to interpret the implications for humanities departments, there are potential implications for geography programs. Many universities have long offered geography or environment courses that use an interdisciplinary or pop-culture theme as a vehicle for teaching geography and environmental science. These include courses on the geography of sports; beer, wine, or spirits; surfing; drugs; travel; and cuisine. The word clouds suggest that there might be additional opportunities for interdisciplinary or team-taught courses that expose students to what geographers do through art, music, dance, sports, or other topics.

The stratification of key word and departmental primitives by student characteristics, combined with the multivariable models of each term, also presents opportunities to target specific undergraduate student profiles for recruiting—and especially address the gendered perceptions of geography terminology. Our study provided deep and consistent insights about undergraduate perceptions that will enable evidence-based program decisions at each participating university. We have made all of the study instruments, survey protocols, and other implementation documents available in the Supplemental Material for this article. We encourage institutions grappling with identity issues to implement their own surveys and use the data presented here as a baseline after noting the caveats outlined next.

Limitations

The findings of this study must be interpreted in the context of several important limitations. First and foremost, our sample is not a true random sample of any of the four study institutions. For example, students who were taking online or night courses, or otherwise spent less time on campus during business hours, had a much lower chance of being surveyed. Given the cross-sectional study design, we know nothing about the trajectories of the student ratings for any tested item; that is, whether they are rising, falling, or remaining stable over time. The results offer but a snapshot of student perceptions during the study period. Notably, the study was implemented at CCU just months after Hurricane Florence brought devastating floods to the Carolinas and at SDSU just months after some of the most severe wildfires in Southern California's history. Given these events, there is no conclusive evidence that students at either school rated language around climate change, sustainability, or other related themes significantly higher than students from UM and MSU, but we also had no baseline data to assess whether local natural disasters might change interest or receptivity in these topics.

Our study sample is also not necessarily representative of all university students in the United States. The lack of external funding limited our ability to implement the study at additional types of institutions, such as small liberal arts colleges, other private institutions besides UM, community and junior colleges, and universities where the geography department is situated in a natural science–oriented college. This last point is particularly important, because none of the geography departments in our study were positioned in a college of geosciences or natural sciences, and it is possible that the university positioning of geography within a STEM college might affect the perception of the assessed words and phrases. That said, MSU is heavily oriented toward the applied sciences, and their students perceived most of the items similarly to the students at the other institutions, but MSU geography is situated in the College of Social Science. The designation of geography curricula as STEM also sometimes depends on the kind of college that houses it (Domosh 2014), and this could further shape student perceptions of geography, environment, and sustainability. That said, we did achieve a large sample through quota sampling that allowed us to detect small differences in term ratings. The consistent results we observed across institutions suggest that students elsewhere are likely to provide similar ratings; we encourage additional research to test these hypotheses.

We emphasize the value of academic departments getting to know their respective student bodies but also the realities of campus politics around the perceived ownership of academic terminology and subdisciplines. An academic unit's ability to implement name changes or rebranding efforts is shaped by forces beyond the department or program. These include the presence or absence of competing programs from cognate disciplines, the organization of departments into schools and colleges, the strategic vision of campus administrators, and grade school educational trends that shape prospective college students. However consistent and compelling our study results might seem, what works at one institution might not work at another, and we urge deliberation over haste in departmental renaming decisions. For example, we caution against overinterpreting these multivariable results and operationalizing them into student recruitment strategies without careful institutional reflection. Although it might seem tempting, we only modeled six coarsely categorized student characteristics and omitted important characteristics such as racial and ethnic identity from our study design. We temper our caution by acknowledging the reality that academia has become increasingly dynamic (and budget driven) in the information age, and social science programs must constantly weigh scholarly tradition against regional, national, and global relevance.

Several of geography's national professional organizations and societies declined modest funding requests (i.e., hundreds of dollars) to support this project, despite unanimously expressing interest in the study. This lack of ability or commitment by professional organizations at the forefront of branding and promoting geography across the United States to support similar projects is troublesome. We hope that the results presented in this article activate these organizations to engage more with research on higher education as they have in the past and participate in any related follow-up work. If not, academic geographers might be well served to rethink their professional alliances as they rethink their own departmental strategies, because it is hard to devise a more existentially compelling issue than assessing the language that we use to present our educational value to the world.

Conclusion

The competition between disciplines for recruiting undergraduate majors is as difficult as ever, and there is a sizable disconnect between the way in which today's undergraduates and academics perceive the academic language used by geography, environment, and sustainability programs. Clinging to old academic jargon, or changing department and program names without an evidence base, could pose significant risk for geography departments, particularly those at institutions with responsibility center management budget models that prioritize course enrollments and numbers of majors. Estaville, Brown, and Caldwell (2006) called for surveying student perceptions to help refine geography's approach to branding and recruitment, but few (if any) departments have produced generalizable data. We hope that departments currently engaged in rebranding efforts will use our study and posted materials to enhance this preliminary evidence base and evaluate student perceptions alongside other institutional factors.

As Clarke (2011) noted in his own critique of *Understanding the Changing Planet*, he was drawn to geography as a field of study by his love of maps, field-based learning (especially involving international travel), and the thrill of understanding how the world works, not necessarily by the righteousness of pursuing grand challenges—even if it ranks among what geographers do best. Our data suggest that today's students might be better drawn to geography through more accessible language that showcases geography's propensity for interdisciplinary study, fieldwork opportunities, and engagement with nature–society interactions. Geographers should reconsider how to (re)capture such wonder and excitement using language that conveys geography's integrative nature as a vehicle for understanding a complicated world.

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Author Contributions

Justin Stoler, Diana Ter-Ghazaryan, Ira Sheskin, and Piotr Jankowski conceived the study. Justin

Stoler, Diana Ter-Ghazaryan, and Ira Sheskin created the study instruments. Data collection was led by Justin Stoler, Diana Ter-Ghazaryan, and Ira Sheskin at UM; Amber L. Pearson and Gary Schnakenberg at MSU; Justin Stoler and Dominique Cagalanan at CCU; and Justin Stoler, Kate Swanson, and Piotr Jankowski at SDSU. Justin Stoler and Amber L. Pearson analyzed the data. Justin Stoler managed the data and drafted the article. All authors edited the article and approved the final draft.

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Supplemental Material

An archive of supplemental content is available via Taylor & Francis Online at http://dx.doi.org/10.1080/24694452.2020.1766412. The archive contains the original student survey in text format and Qualtrics' proprietary file format for direct import, a crosswalk for recoding undergraduate majors, survey approach scripts, and a sample classroom prompt (Supplemental Files 1–5), as well as additional data tables related to sampling and bivariate and multivariable quantitative analyses (Supplemental Files 6–10).

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