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Where do Latinas and Latinos Earn Social Science Doctorates?

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Abstract: It is a national imperative to increase the percentage of Latinas and Latinos who earn doctorate degrees in the social sciences and who enter into faculty positions. For the purposes of this study, I focus on whether Latinas and Latinos earned their doctorates at the nation's most research-intensive universities because those schools are uniquely equipped to prepare doctoral students for careers in academia. I find that more than 40% of Latinas and Latinos who earned social science doctorates did so at universities with lower research profiles. I also test whether there are relationships between Latinas' and Latino's undergraduate institutions (e.g., community colleges and Hispanic Serving Institutions) and doctoral universities (classified by research-intensity). I did not find a relationship between attending community college and the type of university where a Latina or Latino social scientist earned the PhD. However, I found that Latinas and Latinos who earned baccalaureate degrees from Hispanic Serving Institutions (HSIs) had higher relative risk of earning doctorates from less research-intensive universities. This institutional pathway may be beneficial for increasing the number of Latinas and Latinos who earn social science doctorate degrees; however, it may be problematic for preparing future faculty members. I discuss implications for supporting the Latina-Latino pathway to the PhD.

Keywords: Hispanic Serving Institutions; Community Colleges; Graduate Education; Latinx; Hispanic

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¿Dónde obtienen las Latinas y los Latinos sus doctorados en ciencias sociales?

Resumen: Aumentar el porcentaje de latinas y latinos con doctorados en ciencias sociales que ocupen cargos entre el profesorado es un imperativo nacional. Para efectos de este estudio me centraré en estudiar si las latinas y los latinos que se doctoraron obtuvieron sus títulos en las universidades nacionales más enfocadas en investigación porque estas escuelas son las mejor equipadas para preparar a los estudiantes de doctorado para la carrera académica. Encontré que el 40% de las latinas y los latinos que se doctoraron en ciencias sociales lo hicieron en universidades con perfiles menos enfocados a la investigación. También busqué si había alguna relación entre los centros universitarios donde estudian las latinas y los latinos (por ejemplo, colegios comunitarios o Instituciones de Servicios para Hispanos) y las universidades donde preparan su doctorado (clasificadas por su atención a la investigación). No encontré relación alguna entre la asistencia a un colegio comunitario y el tipo de universidades donde las latinas y los latinos que estudiaron ciencias sociales obtuvieron su doctorado. Sin embargo, sí encontré que las latinas y los latinos que obtuvieron su licenciatura en Instituciones de Servicio para Hispanos (ISH) tenían un mayor riesgo relativo de obtener su doctorado en una universidad menos enfocada en la investigación. Esta ruta institucional podría ser beneficiosa para aumentar el número de latinas y latinos que obtienen títulos de doctorado en ciencias sociales; sin embargo, podría resultar problemática a la hora de formar futuros profesores universitarios. También trato las implicaciones de respaldar una ruta para latinas y latinos hacia la obtención de un doctorado.

Palabras-clave: Instituciones de Servicio para Hispanos; colegios comunitarios; educación universitaria; latinx; hispano

Onde Latinas e Latinos obtêm seu doutorado em ciências sociais?

Resumo: Aumentar a porcentagem de latinas e latinos com doutorado em ciências sociais ocupando cargos entre professores é um imperativo nacional. Para os fins deste estudo, vou me concentrar em estudar se as latinas e os latinos que receberam seus doutorados obtiveram seus diplomas nas universidades nacionais mais focadas em pesquisa, porque essas escolas estão melhor equipadas para preparar estudantes de doutorado para carreiras acadêmicas. Descobri que 40% das latinas e latinos que obtiveram doutorado em ciências sociais o fizeram em universidades com perfis menos focados em pesquisa. Também procurei ver se havia uma relação entre os centros universitários onde estudam latinas e latinos (por exemplo, faculdades comunitárias ou instituições de serviços hispânicos) e as universidades onde eles preparam seu doutorado (classificado por sua atenção à pesquisa). Não encontrei relação entre frequentar uma faculdade comunitária e o tipo de universidade em que as latinas e os latinos que estudavam estudos sociais obtiveram seu doutorado. No entanto, descobri que latinas e latinos que obtiveram seu diploma de bacharel em instituições hispânicas de serviço (ISH) tinham um risco relativo mais alto de obter seu doutorado em uma universidade menos focada em pesquisa. Esse caminho institucional pode ser benéfico para aumentar o número de latinas e latinos com doutorado em ciências sociais; no entanto, pode ser problemático ao treinar futuros professores universitários. Discuto também as implicações de apoiar um caminho para as latinas e os latinos na obtenção de um doutorado.

Palavras-Chave: Instituições de Serviço Hispânicas; colegios da comunidade; Formação universitária; latinx; hispânico

Introduction

There is little empirical research that focuses on where Latinas and Latinos earn doctorate degrees in the social sciences. Latinas and Latinos are the largest and fastest-growing minority group in the United States, but they do not earn doctorates relative to their share of the population (National Science Foundation, 2015; U.S. Census Bureau, 2012). As early as 1995, scholars reported that “Chicanas/os [were] underrepresented in the production of doctorates overall and in the social sciences in particular [emphasis added]” (Solórzano, 1995, p. 23). The proportion of Latinas and Latinos who earned doctorates increased in recent decades, but they continued to be underrepresented among graduating cohorts of social scientists. For example, in 2014, Latinas and Latinos earned less than 8% of doctorates in social sciences, even though they made up more than 17% of the population. African Americans and Asians also earned similar percentages of social science doctorates even though those racial groups make up smaller percentages of the U.S. population (National Science Foundation, 2015; U.S. Census Bureau, 2012). Therefore, Latinas and Latinos are underrepresented in the social sciences relative to their share of the national population, as well as relative to the representation of other racial minority groups.

It is a national imperative to increase the percentage of Latinas and Latinos who earn doctorate degrees in the social sciences. Doctoral training in the social sciences prepares Latinas and Latinos to participate in scholarly and policy discourses about issues such as income inequality, social equity, and mass migration. At the same time, it matters whether Latinas and Latinos earn doctorate degrees at universities that are well-suited to prepare them to take faculty positions. As social science faculty, Latinas and Latinos can produce knowledge and address challenging social issues, take positions as faculty members, and mentor the next generation of underrepresented students (Gumport, 2002; Woodrow Wilson National Fellowship Foundation, 2005).

The fact that there are so few faculty of color on college and university campuses results in high levels of “race-related service,” including copious committee work and expectations of mentoring students of color, which White faculty do not experience (Baez, 2000). Increasing faculty diversity would challenge universities to change their service expectations—or would at least allow faculty of color to help each other shoulder one another’s burdens. Moreover, increasing Latina and Latino representation among the ranks of the faculty would improve the racial climate and improve retention of people of color already working in academia (Fries-Britt, Rowan-Kenyon, Perna, Milem, & Howard, 2011). Finally, if Latinas and Latinos do not make up larger percentages of new doctorates and faculty, then the United States will draw its faculty and social scientists from a declining share of the population (U.S. Department of Education and White House Initiative on Educational Excellence for Hispanics, 2011).

Relative to the broad-access sector, students who attend selective colleges and universities have higher odds of enrolling in graduate school and earning advanced degrees from major research universities (e.g., Bowen & Bok, 1998; Eide, Brewer, & Ehrenberg, 1998; Lang, 1987; Zhang, 2005). The nations’ most selective and research-intensive universities, in turn, offer better opportunities for doctoral students to pursue faculty careers (e.g., Bedeian, Cavazos, Hunt, & Jauch, 2010; Burris, 2004). Although selective and private universities may offer a strategic pathway to doctorate degrees, most Americans (especially ethnic or racial minorities) attend other segments of the U.S. higher education system (Deil-Amen, 2015; Scott, 2015). In particular, community colleges and Hispanic Serving Institutions (HSIs) are important points of entry to U.S. higher education for Latinas and Latinos—especially those who later earn doctorate degrees (e.g., Contreras & Gándara, 2006; Fernandez, 2018; Lundy-Wagner et al., 2013; Solórzano, Rivas, & Velez, 2005).

It is difficult to develop policy recommendations to improve the representation of Latinas and Latinos among new PhDs and social science faculty unless scholars develop a better understanding of the types of universities that award social science doctorates to Latinas and Latinos. Scholars tend to focus on the types of colleges and universities that Latinas and Latinos first attend before enrolling in graduate schools (e.g., Castellanos, Gloria, & Kamimura, 2006; Lundy-Wagner et al., 2013; Solórzano, 1995; Solórzano et al., 2005), but understanding Latinas' and Latinos' pathways to the PhD can help us consider where—and for what purposes—we should focus resources and interventions. Therefore, the purpose of this paper is to identify opportunities to improve pathways for Latinas and Latinos to earn social science PhDs and potentially enter faculty positions. To this end, I address the following research questions: *What types of universities (categorized by research intensity) did Latina and Latino social science PhDs attend? In what ways were Latina and Latinos' educational backgrounds (in particular, whether they attended a community college or four-year HSI) related to the research intensity of the universities where they earned social science doctorates?*

Literature Review

Students who attended selective or private colleges and universities had higher odds of enrolling in graduate school and earn graduate degrees from major research universities (e.g., Bowen & Bok, 1998; Eide et al., 1998; Lang, 1987; Zhang, 2005). For example, Zhang (2005) found that students who graduate from selective colleges and universities have higher odds of (a) enrolling in (and graduating from) advanced degree programs; (b) enrolling in doctoral programs; (c) attending selective research universities. Although literature demonstrated that selective and private universities offered the likeliest pathway to the doctorate, most Americans, especially ethnic or racial minorities and poorer students, attended other segments of the U.S. higher education system (Deil-Amen, 2015; Scott, 2015).

The most broadly accessible segment of U.S. higher education is the community college sector. Though broadly accessible, research on two-year colleges has traditionally supported the idea that community colleges further stratify American higher education and society (Labaree, 2012). Carter (1999) examined whether the type of college or university that students first attended influenced future degree expectations. She found that relative to students who went to community colleges, students who went to four-year colleges and universities tended to have aspirations to pursue more advanced degrees. Carter's (1999) findings supported the idea that "community colleges tend to limit the educational achievement of students" (p. 35).

Although students of color disproportionately enroll at community colleges and many do not graduate (Sáenz, 2004), large percentages of Latinas and Latinos who earned doctorate degrees between 1990 and 2000 previously attended community colleges (Solórzano et al., 2005). During the 1990s, nearly one-quarter of new PhDs who previously attended a community college, earned the doctorate in a social science field (Solórzano et al., 2005). Between 2000 and 2010, a similar descriptive analysis found that just over one-quarter of doctorates in education, humanities, and social science fields had previously attended community colleges (Fernandez, 2018).

Similar to community colleges, HSIs offered broad access to Latinas and Latinos, in part, because most HSIs were not very selective (Núñez & Elizondo, 2015; Núñez, Sparks, & Hernández, 2011). More than half of all Latinas and Latinos who pursued undergraduate degrees attended HSIs, which are colleges and universities with student bodies that include at least 25% Latina and Latino students (Santiago et al., 2016a). In early work on this topic, Solórzano (1995) analyzed data from the 1980s on the undergraduate origins of Latina and Latino social scientists and concluded that "the role of HSIs in the development of Chicana/o social and behavioral science doctorates must be

examined more closely” (p. 28). Since then, the number of HSIs increased as Latinas and Latinos made up a larger share of the U.S. college-going population. The number of HSIs has increased as Latinas and Latinos became increasingly represented on many campuses, but prior to 2010, only a small percentage of HSIs awarded the doctorate (Contreras & Gándara, 2006; Santiago et al., 2016a).

Scholars and policymakers have suggested that HSIs are an important institutional type for improving Latina and Latino doctoral attainment (e.g. Contreras & Gándara, 2006; Lundy-Wagner et al., 2013). HSIs have offered an important point of entry to higher education for Latinas and Latinos; on average they accepted 60% of applicants but many accepted 100% of eligible students (Núñez & Elizondo, 2015). Four-year HSIs also enrolled larger percentages of poor Latinas and Latinos compared to non-HSIs (Flores & Park, 2015) and tended to enroll less academically prepared students (Núñez & Bowers, 2011). Compared to selective institutions, HSIs tended to have low graduation rates and were widely outspent in academic expenditures (Santiago et al., 2016a, 2016b). If baccalaureate alumni of selective colleges and universities had higher odds of attending doctoral programs at research-intensive universities (e.g., Eide et al., 1998; Zhang, 2005) then the fact that, during the period examined in this study, most HSIs were not very selective suggested that their alumni may have attended doctoral programs at less-research-intensive-universities.

Research About Doctorate-Granting Institution Types

Scholars of graduate education have focused on the most research-intensive universities. Little quantitative research has focused on the role of less research-intensive universities in doctoral education (Barnes & Randall, 2012). Historically, universities with the highest levels of research activity have received the lion’s share of financial support from the federal government to award fellowships to minority students (Geiger, 2004, 2009; Woodrow Wilson National Fellowship Foundation, 2005). However, qualitative studies suggested that many people—in particular, low-income, first-generation, or racial and ethnic minority students—earn doctorates at universities with lower research profiles (e.g., Grimes & Morris, 1997; Warnock & Appel, 2012).

Scholars have indicated that, like other groups of working-class students, Latinas may not have been looking to attend the most research-intensive universities or that it may have been difficult for Latinas to move far from home to do so. For example, Espino, Muñoz, and Kiyama (2010) described “the struggles Mexican American doctoral students experience . . . [which is] exacerbated by the physical and psychological distances from the institution to home” (p. 810). Latinas and Latinos have described that accessing and choosing a university to pursue the doctorate is altogether different from the difficulties inherent in undergraduate education. Narratives from Mexican American doctorate degree earners show that while “community cultural wealth provided currency in secondary school and during undergraduate education” by the time pursued PhDs, their “marginalized forms of capital had limited currency” as they “navigate[d] educational systems that maintain individualism and competition rather than interdependence and cooperation” (Espino, 2014, p. 568).

It is important to study the research intensity of doctorate-granting universities because a university’s research environment is an important part of the doctoral student experience. Research-intensive universities are important sites for socializing graduate students to academic norms (Antony, 2002; Austin & McDaniels, 2006; Ferrales & Fine, 2005; Sweitzer, 2009; Wulff & Austin, 2004). Twale, Weidman, and Bethea’s (2016) framework posits that research opportunities are a core element in the formal stage of socializing graduate students of color. Moreover, faculty at research-intensive universities tend to be more comfortable preparing their doctoral students to pursue faculty careers (e.g., Ehrenberg, Jakubson, Groen, So, & Price, 2007) than advising them about non-academic career opportunities. In fact, many faculty members are trained and hired from the same

network of research-intensive universities (Bedeian et al., 2010; Burris, 2004). Among new PhDs, a university's research profile was positively related to whether Latinas and Latinos planned to pursue faculty careers after graduation (Fernandez, 2019).

Conceptual Framework

I draw on Posselt's (2016, 2018) work on graduate admissions to inform my examination of the relationships between previously attended institutions and doctorate-granting universities. Posselt (2016) conducted an ethnographic study with faculty members at some of the nation's leading research universities. She showed that professors on admissions committees often rely on subjective perceptions of merit that may have negative implications for underrepresented students. Many faculty members tended to make admissions decisions in ways that reflect preferences for applicants with shared backgrounds (i.e., those who attended similar types of undergraduate universities). As admissions committees worked their way through the final round of admissions decisions, many professors use the selectivity or prestige of an applicant's undergraduate institution to evaluate a potential student's merit or quality (Posselt, 2016).

Drawing on her findings about how faculty members perceive merit, Posselt (2018) developed a model to explain the structure of trust networks in the graduate admissions process. Posselt's model postulated that during the doctoral admissions process, professors often "default to assumptions about institutional quality as a proxy for student quality" (2018, p. 503). Drawing on prior research, she suggests that the perceived quality of undergraduate institutions is, in one sense, a matter of trust. Professors who are making admissions decisions trust highly selective universities or research-intensive universities with similar doctoral programs to send alumni who are well-prepared for doctoral studies. Posselt concludes that "professors may be more inclined to place their program's funds and reputation . . . in the hands of applicants with high-status affiliations" (2018, p. 504). The purpose of this paper is not to test Posselt's full model of trust networks, but the part of the model that focuses on undergraduate institutions is useful for considering whether there are relationships between the schools that Latinas and Latinos attend at the undergraduate and doctorate levels.

Many Latinas and Latinos attend community colleges and earn their undergraduate degrees from HSIs. Although HSIs are important institutional types in the Latina-Latino pathway to the doctorate (e.g., Castellanos et al., 2006), they are also among the least selective institutional types in American higher education. In Posselt's (2016) study, public institutions were only viewed favorably if they were flagship campuses of state universities. However, aside from the University of New Mexico, state flagships have not historically been HSIs (Fernandez, 2017). Thus, when faculty members at research-intensive universities make their final decisions about admitting doctoral students and awarding funding, they may be less likely to admit Latinas and Latinos who completed undergraduate degrees at HSIs.

Posselt's (2016) work provides an important conceptual framing for interpreting the relationships between earning a baccalaureate degree from an HSI and earning a doctorate at various types of doctoral universities. Without Posselt's insights into the doctoral admissions process, it might seem reasonable to primarily attribute the relationship to student characteristics. For example, if HSI alumni have lower odds of earning a social science doctorate degree at the nation's leading research universities, one might conclude that students who attend HSIs are generally of lower academic ability or that there is something about attending an HSI that socializes students to not attend research-intensive doctoral programs. Instead, Posselt's work on faculty notions of merit

suggests that the mechanism at play may be negative faculty perceptions of non-selective schools, such as HSIs.

Data and Methods

To address my research question, I conducted secondary data analyses of observational Survey of Earned Doctorates (SED) data from 2000 to 2010. SED administered a census of graduates from research-oriented (as opposed to practitioner-focused) doctoral programs at U.S. universities. Respondents were asked questions about their demographics, educational histories, fields of study, and career aspirations (National Opinion Research Center, 2012). The restricted individual-level data constituted the most comprehensive data set of doctorate earners in the United States.

SED included more than 494,000 doctorate degree earners between 2000 and 2010. Latinas and Latinos have been historically underrepresented in American doctoral education, so when I limited the sample to students who self-identified as “Hispanic” and excluded international students, there were approximately 16,000 domestic Latina and Latino doctorate degree earners in the data file. I did not include international doctoral students in the analysis because it would not make sense to try to compare baccalaureate institutions from other countries with the unique category of HSIs in the United States. Moreover, policymakers suggest that we need to focus on improving doctoral attainment of Latinas and Latinos who live in the United States (e.g., Woodrow Wilson National Fellowship Foundation, 2005). Among non-international Latina and Latino respondents, 3,541 graduated from social science programs. I also excluded Latinas and Latinos who earned baccalaureate degrees ($N = 5$) or social science doctorates ($N = 17$) from for-profit institutions, leaving a final data set of 3,519 social science doctorate earners.

Dependent Variable

I used a categorical dependent variable, *Research Profile*, to represent four types of universities that awarded doctorates to Latina and Latino students (1 = Other Universities, 2 = Doctoral Research Universities, 3 = Research Universities with High Research Activity, 4 = Research Universities with Very High Research Activity). I created the *Research Profile* variable using the Carnegie Classifications Data File that was appropriate for the period of study (Carnegie Foundation for the Advancement of Teaching, 2012). The Doctoral Research Universities (DRU), Research Universities with High Research Activity (HRU), and Research Universities with Very High Research (VHRU) activity were original Carnegie categories. The Carnegie Foundation used principal components analysis on rank order data, which explained 71% of the total variance in research activity of the three categories. The Carnegie Foundation also calculated per-capita research and aggregated research indices to plot a distribution of the research activity of the different types of universities. The VHRUs had the highest index scores on both measures, while the other categories had lower scores. I aggregated all other universities that granted doctorates into a single category I called Other Universities.

Gonzaga University and Loma Linda University are example of the Other Universities included in this study. The New School and American University are examples of the category of doctoral research universities. The category of research universities with high research activity includes Claremont Graduate University and Boston College. Finally, the VHRU category includes schools such as Pennsylvania State University and Stanford University. Table 1 includes a breakdown of the dependent variable, Research Profile, for Latinas and Latinos who earned doctorate degrees in the social sciences.

I categorized universities that granted doctorates according to their levels of research intensity, because in the United States less research-intensive universities were allowed to develop and operate doctoral programs; in doing so, they opened access for students who may not have otherwise had the opportunity to earn doctorates (e.g., Berelson, 1960). Thus, by using the *Research Profile* variable, I test whether there are statistically significant relationships between Latinas' and Latinos' background characteristics or educational experiences and the research intensity of their doctorate granting university. This manner of classifying doctoral institutions is especially important because research tends to favor the most research-intensive universities (Barnes & Randall, 2012). See Table 1 for descriptive statistics for the dependent variable and covariates.

Key Independent Variables

The two key independent variables of interest recorded data on undergraduate institutions. The first was a categorical variable called *Baccalaureate Institution*, which represented mutually exclusive categories of universities (1 = Hispanic Serving Institution, 2 = non-HSI public university, 3 = non-HSI private university). The mutually exclusive categories allowed me to examine the relationship between HSIs and doctoral universities. The categorical independent variable also disaggregated between public and private non-HSI universities because alumni of private liberal arts colleges or private selective universities may have had higher odds of being admitted to research-intensive doctoral programs than alumni of public universities (e.g., Posselt, 2016; Zhang, 2005). The estimated coefficients for the *Baccalaureate Institution* variable quantified the relationship between the types of institutions where students earned undergraduate degrees and the types of doctoral institutions where they earned social science doctorate degrees.

I also added a dichotomous *Attended Community College* variable (0 = did not attend community college, 1 = attended community college) to test whether attending a community college may have been related to where students earned doctorate degrees. Prior research suggested that attending a community college may have deflated educational aspirations (Carter, 1999), and the conceptual framework suggests that admissions committees would not have looked highly on prior community college attendance (Posselt, 2016, 2018). Community college attendance was relevant for this population because many Latina/os attended community college prior to earning doctorate degrees (e.g., Solórzano et al., 2005).

Control Variables

I controlled for several variables that researchers suggested were related to where students enrolled in doctoral programs. First, I included *Age* (a continuous variable) at the time students entered graduate school. Second, I used a dichotomous variable to represent whether respondents identified as *Female* (coded male = 0, female = 1). Third, I added a variable that represented *Parental Education* (measured as the highest level of education received by either parent, ranging from 1 = less than high school diploma to 7 = research doctorate).

Table 1

Descriptive Statistics of Latina and Latino Social Science Doctorate Degree Earners, 2000-2010 (N = 3519)

Variable	Mean	SD	Min	Max	<u>Missing</u> (N)	<u>Missing</u> (%)
<i>Dependent Variable</i>						
Other Universities	0.11	0.01	0	1	4	0.11%
Doctoral Research Universities	0.08	0.00	0	1	4	0.11%
Research Universities with High Research Activity	0.22	0.01	0	1	4	0.11%
Research Universities with Very High Research Activity (Reference Group)	0.60	0.01	0	1	4	0.11%
<i>Background Characteristics</i>						
Age	25.35	4.72	18	74	472	13.41%
Gender: female	0.65	0.01	0	1	0	0.00%
Parental Education	3.70	0.03	1	7	405	11.51%
<i>Educational Experiences</i>						
Sub-baccalaureate						
Attended Community College	0.21	0.01	0	1	368	10.46%
Baccalaureate						
Non-HSI Public	0.44	0.01	0	1	270	7.67%
HSI	0.26	0.01	0	1	270	7.67%
Non-HSI Private (Reference Group)	0.30	0.01	0	1	270	7.67%

Note: The means of the dichotomous variables indicate the percentages of the sample belonging to a particular group (e.g., Latinas made up 65% of the sample; 21% of the sample attended community college).

Analytic Strategy

I used the Stata statistical package to descriptively analyze SED data to address the first research question and to conduct multinomial logistic estimation to address the second research question. Multinomial logistic estimation can also be understood as a combination of binary logistic regression equations (Long & Freese, 2014). This method of analysis estimated the relative risk of a student earning a social science doctorate degree from one category of doctoral university, relative to a base or reference category. For this paper, I regressed the categorical dependent variable, *Research Profile* on covariates (listed above) for the pooled sample of Latinas and Latinos who earned social science doctorate degrees between 2000 and 2010. I selected Research Universities with Very High Research Activity as a reference group; therefore, the regression results represented the likelihood of earning a doctorate from one of the three categories of universities relative to earning a doctorate degree at the most research-intensive universities. I specified the multinomial logit model according to the general form presented in Equation 1 (Long & Freese, 2014, p. 390).

$$\ln \Omega_{m|b}(x) = \ln \frac{\Pr(y=m|x)}{\Pr(y=b|x)} = x\beta_{m|b} \text{ for } m = 1 \text{ to } J \tag{1}$$

More specifically, the model included all the variables outlined above to account for the control variables when estimating the relationship between *Baccalaureate Institution* and *Research Profile*. Thus, the multinomial logit model included the following set of equations:

$$\begin{aligned}
& \ln \Omega_{1|3} (x_i) \\
& = \beta_{0, \text{OTHER|VHRU}} + \beta_{1, \text{OTHER|VHRU}} \textit{Age} + \beta_{2, \text{OTHER|VHRU}} \textit{Gender} \\
& + \beta_{3, \text{OTHER|VHRU}} \textit{Parental Education} + \beta_{4, \text{OTHER|VHRU}} \textit{Attended Community College} \\
& + \beta_{5, \text{OTHER|VHRU}} \textit{Baccalaureate Institution} \tag{2}
\end{aligned}$$

$$\begin{aligned}
& \ln \Omega_{1|3} (x_i) \\
& = \beta_{0, \text{DRU|VHRU}} + \beta_{1, \text{DRU|VHRU}} \textit{Age} + \beta_{2, \text{DRU|VHRU}} \textit{Gender} + \beta_{3, \text{DRU|VHRU}} \textit{Parental Education} \\
& + \beta_{4, \text{DRU|VHRU}} \textit{Attended Community College} \\
& + \beta_{5, \text{DRU|VHRU}} \textit{Baccalaureate Institution} \tag{3}
\end{aligned}$$

$$\begin{aligned}
& \ln \Omega_{1|3} (x_i) \\
& = \beta_{0, \text{HRU|VHRU}} + \beta_{1, \text{HRU|VHRU}} \textit{Age} + \beta_{2, \text{HRU|VHRU}} \textit{Gender} + \beta_{3, \text{HRU|VHRU}} \textit{Parental Education} \\
& + \beta_{4, \text{HRU|VHRU}} \textit{Attended Community College} \\
& + \beta_{5, \text{HRU|VHRU}} \textit{Baccalaureate Institution} \tag{4}
\end{aligned}$$

In other words, the multinomial logit model calculated the estimated probability of being in the first, second, and third categories, relative to the fourth category, $\beta_{\text{OTHER|VHRU}}$, $\beta_{\text{DRU|VHRU}}$, and $\beta_{\text{HRU|VHRU}}$.

I estimated three separate models. The first model included only the control variables for student characteristics. The subsequent model included a second set of covariates that represent students' undergraduate institutions, including *Baccalaureate Institution* and *Attended Community College*. A third model included both the student characteristics and the undergraduate institutions variables.

Missing Data

Although SED provided population-level (as opposed to sample) data, it is still appropriate to account for missing data before proceeding with multinomial logistic estimation. I accounted for missing data using the chained equations approach to multiple imputation (Allison, 2001). Multiple imputation with chained equations preserves incomplete cases that would otherwise be deleted, and it also requires post hoc analysis. I used Rubin's (1987) rule to calculate appropriate estimates of coefficients and standard errors from the multiply imputed data. Following Johnson and Young (2011), I imputed 25 datasets to meet the fully conditional specification standard.

Limitations

It is worth acknowledging that baccalaureate colleges can be classified in many ways. For example, an institution can be classified in terms of its selectivity or research profile, whether it is public or private, a land grant institution or not, a minority serving institution or not, and many other characteristics. Some scholars may disagree with how I aggregated all HSIs into a single category. One limitation with the HSI variable is time; universities were coded as HSIs if they held that designation in 2010, but they may not have started the decade as HSIs. In this cross-sectional analysis, I was overly inclusive of HSIs to capture schools that may have been more selective or that only relatively recently achieved HSI status. Another limitation with the HSI variable is that some scholars have argued that HSIs should be categorized into six-different types of schools (e.g., Núñez, Crisp, & Elizondo, 2016). Based on the conceptual framework, I did not disaggregate HSIs into multiple categories, because there is little reason to believe that faculty at highly research-intensive doctoral programs were considering undergraduate HSIs with such nuance while they were reproducing the “homophily of the pedigree” (Posselt, 2016, p. 99).

The dichotomous community college variable was limited in that it did not measure amount of exposure to community college. For example, the variable does not distinguish between students who first attended a community college but transferred without earning an associate’s degree and those who completed a degree-granting program of study. Nevertheless, using the dichotomous variable was consistent with prior studies that examined the importance of community colleges in the pathway to the PhD for the Latina and Latino community. (Solórzano, 1995; Solórzano et al., 2005). For both the HSI and community college variables, I coded schools as institutional types that were consistent with prior literature, important for this population of students, and useful because they sort thousands of institutions into categories that can be used for informing policy.

Another limitation arises from the fact that the dataset only included graduate students who completed their doctoral programs. The sample did not include all Latinas and Latinos who enrolled or were accepted to doctorate programs in the social sciences. It may be that doctoral programs at VHRUs enrolled larger numbers of students who graduated from HSIs, but those students did not graduate from the doctoral program, which is when graduate students complete SED. However, SED was the ideal dataset for this study, which was designed to look at the underrepresentation of Latinas and Latinos among those who earned doctorate degrees; it is outside the scope of the study to examine application, admission, and retention issues for Latina and Latino doctoral students in the social sciences.

Findings

I addressed the first research question using descriptive statistics from the data. Approximately three in five (59.34%, $N = 2,099$) Latina and Latino social scientists earned their doctorates at Research Universities with Very High Research Activity. Just over one in five (21.57%, $N = 763$) earned doctorate degrees from Research Universities with High Research Activity. Additionally, 8.17% ($N = 289$) and 10.91% ($N = 386$) of Latinas and Latinos earned the doctorate in social sciences from Doctoral Research Universities and Other Universities, respectively. This was important because it showed that Latinas and Latinos earned the doctorate at a range of universities, and statistically each category has a large enough number of cases to allow for statistical analyses to address the second research question. More importantly, the breakdown of the dependent variable demonstrated that even though Research Universities with Very High Research Activity awarded the largest percentage of doctorates to Latinas and Latinos, the other, often ignored, categories of universities trained more than 40% of Latina and Latino social scientists.

For the second research question, I use three tables to summarize parameter estimates from the multinomial logistic regression models. In each table, the estimated coefficients represent relative risk of earning a social science doctorate from one type of university (i.e., Other Universities; Doctoral Research Universities; Research Universities with High Research Activity), relative to VHRUs. The second and third models (M2 and M3) included dummy variables that represented students' undergraduate institutions. The first educational experience variable indicated whether Latinas and Latinos attended community colleges. The estimates suggested that after considering baccalaureate institutions, there was not a consistent relationship between attending community college and earning doctorates at different types of institutions. For example, in Table 3 we see that the RRR changed from 1.04 in the second model to 0.89 in the third model. A similar pattern existed for the estimates of attending Doctoral Research Universities (Table 4). The *Attended Community College* variable was not statistically significant after controlling for background characteristics and baccalaureate institutions. Based on these estimates, students who attended community colleges did not appear to be at lower risk of earning a doctorate at a VHRU.

Latinas and Latinos who earned baccalaureate degrees at HSIs (compared to non-HSI private universities) had higher relative risk of having earned a social science doctorate degree at less research-intensive institutions, compared to VHRUs. Among students who earned baccalaureate degrees at HSIs, the relative risk of earning a doctorate at an Other University increased by a factor of 5.33, controlling for educational experiences and background characteristics (Table 2, M3). The relative risks were also large, albeit somewhat smaller than 5.33, for graduating from a doctoral program at a Doctoral Research Universities (RRR = 3.63) or a Research University with High Research Activity (RRR = 3.23). See Table 3 and Table 4.

Table 2
Multinomial Logistic Estimation of Earning Doctorate at Other Universities

<u>Independent Variable</u>	<u>Background Characteristic (M1)</u>		<u>Undergraduate Institution (M2)</u>		<u>Background & Undergraduate (M3)</u>			
	<u>RRR</u>	<u>SE</u>	<u>RRR</u>	<u>SE</u>	<u>RRR</u>	<u>SE</u>		
<i>Background Characteristics</i>								
Age	1.03	*	0.01		1.03	*	0.01	
Female	1.86	***	0.23		1.96	***	0.26	
Parental Education	0.94		0.03		0.99		0.04	
<i>Educational Experiences</i>								
Sub-Baccalaureate Institution								
Attended Community College			1.34	†	0.21	1.28	0.20	
Baccalaureate Institution (Reference Group: Non-HSI Private)								
Hispanic Serving Institution			5.31	***	0.82	5.33	***	0.84
Non-HSI Public University			0.87		0.15	0.85	0.14	
M1: $F(9, 8346.4) = 7.31^{***}$ M2: $F(9, 11466.7) = 31.64^{***}$ M3: $F(18, 20832.4) = 18.17^{***}$								

Note: The reference group for the dependent variable is VHRU. † $p < 0.10$ * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3

Multinomial Logistic Estimation of Earning Doctorate at Doctoral Research Universities

<u>Independent Variable</u>	Background Characteristics (M1)		Undergraduate Institution (M2)		Background & Undergraduate (M3)			
	<u>RRR</u>	<u>SE</u>	<u>RRR</u>	<u>SE</u>	<u>RRR</u>	<u>SE</u>		
<i>Background Characteristics</i>								
Age	1.06	***	0.01		1.06	***	0.01	
Female	1.39	*	0.19		1.43	*	0.20	
Parental Education	0.90	**	0.04		0.92	†	0.04	
<i>Educational Experiences</i>								
Sub-Baccalaureate Institution								
Attended Community College			1.04	0.19	0.89		0.17	
Baccalaureate Institution (Reference Group: Non-HSI Private)								
Hispanic Serving Institution			3.92	***	0.72	3.63	***	0.69
Non-HSI Public University			0.95		0.18	0.89		0.17

M1: $F(9, 8346.4) = 7.31^{***}$ M2: $F(9, 11466.7) = 31.64^{***}$ M3: $F(18, 20832.4) = 18.17^{***}$

Note: The reference group for the dependent variable is VHRU. † $p < 0.10$ * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 4

Multinomial Logistic Estimation of Earning Doctorate at Research Universities with High Research Activity

<u>Independent Variable</u>	Background Characteristics (M1)		Undergraduate Institution (M2)		Background & Undergraduate (M3)			
	<u>RRR</u>	<u>SE</u>	<u>RRR</u>	<u>SE</u>	<u>RRR</u>	<u>SE</u>		
<i>Background Characteristics</i>								
Age	1.02	*	0.01		1.02	*	0.01	
Female	1.35	***	0.12		1.38	***	0.13	
Parental Education	0.94	**	0.02		0.96		0.02	
<i>Educational Experiences</i>								
Sub-Baccalaureate Institution								
Attended Community College			1.02	0.12	0.96		0.11	
Baccalaureate Institution (Reference Group: Non-HSI Private)								
Hispanic Serving Institution			3.31	***	0.39	3.23	***	0.38
Non-HSI Public University			0.89		0.10	0.87		0.10

M1: $F(9, 8346.4) = 7.31^{***}$ M2: $F(9, 11466.7) = 31.64^{***}$ M3: $F(18, 20832.4) = 18.17^{***}$

Note: The reference group for the dependent variable is VHRU. † $p < 0.10$ * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Sensitivity Analysis

I estimated two additional multinomial logistic regression models to test whether the findings in Table 2, Table 3, and Table 4 were robust to a different way of coding baccalaureate-granting universities. I combined the non-HSI public and non-HSI private categories into a single reference group by creating a dichotomous variable (1 = HSI, 0 = Non-HSI public and non-HSI private); this model specification yielded a single parameter estimate for Latinas and Latinos who earned baccalaureate degrees at HSIs relative to the rest of the sample. I found that there was a negative relationship between earning a baccalaureate degree at an HSI, relative to all other non-HSIs (both public and private) and earning a social science doctoral degree at a VHRU. Results for this final test are reported by Fernandez (2017).

Additional Findings Related to Background Characteristics

The first and third models (M1 and M2) included variables that represented students' age, gender, and parental education. All three models suggested that age had a statistically significant association with the types of doctoral institutions where Latina and Latino students earned social science doctorates. After controlling for gender and parental education, older students had higher relative risk of earning their doctorates at one of the three categories of less research-intensive universities than at VHRUs. Because age is coded continuously in years, the estimated RRRs represent estimated increases for a student being one year older. Doctoral students such as the middle-aged mothers described by Grimes and Morris (1997) had lower relative risk of earning a social science doctorate at a VHRU than at less research-intensive universities.

Similarly, Latinas had lower relative risk of earning a doctorate at a VHRUs than Latinos, after controlling for age and parental education. For example, if the other variables stayed constant, the relative risk for a Latina to earn a doctorate degree at an Other University—instead of a VHRU—was estimated to increase by a factor of 1.86 (Table 2, M1), and the relative risk increased to a factor of 1.96 after controlling for educational experiences (Table 2, M3). The standard errors accompanying the RRR estimates were relatively small, which suggested that the estimate was consistent for most students. Table 3 and Table 4 illustrated a similar pattern: many Latinas earned doctorates from universities where faculty did less research.

Latinas and Latinos who had more highly educated parents had lower relative risk of earning doctorates at less research-intensive universities compared to VHRUs. For example, the parameter estimates indicated that the relative risk of earning a social science doctorate degree at a Doctoral Research Universities, compared to a VHRU, was estimated to decrease by a factor of 0.90 when parents had an additional level of education after controlling for age and gender (Table 3, M1) and by a factor of 0.92 after controlling for other background characteristics and educational experiences (Table 3, M3). Recall that the RRRs were estimated for a one-unit change in the parental education variable, so the more education parents had, the lower the risk that their children earned social science doctorate degrees at institutions other than VHRUs.

Discussion and Implications

In this paper I examined where Latinas and Latinos earned social science doctorate degrees (in terms of university research intensity) and whether their doctorate granting universities were related to previously attended undergraduate institutions. I found that there was not a consistent statistically significant relationship between attending a community college and the type of university where Latinas and Latinos earned doctorates. In other words, among Latinas and Latinos who earned PhDs, there did not appear to be a 'penalty' for beginning the pathway to the doctorate at a

community college. Conversely, the multinomial logistic estimates show that there is a statistically significant relationship between earning the baccalaureate at an HSI and earning the doctorate at universities with lower levels of faculty research—which are often overlooked in scholarly literature.

Policymakers should consider how they can broaden the pathway from baccalaureate-awarding HSIs to doctorate-awarding VHRUs. For example, HSIs are eligible to receive Title V federal grants to develop their faculties, academic programs, and student support services (Santiago et al., 2016a). However, state and federal policymakers could offer resources to help HSIs provide targeted programs to support Latina and Latino students who may be interested in graduate study. Undergraduate research experiences, such as the federally funded Ronald E. McNair Postbaccalaureate Achievement Programs, help students acculturate to research university norms and aspire to enroll in graduate education (Eagan et al., 2013; Posselt & Black, 2012). However, in 2010, most of the top universities that produced Latina and Latino alumni who went on to earn doctorates did not receive federal funds to provide undergraduate research experiences through the Ronald E. McNair Postbaccalaureate Achievement Programs (Fernandez, 2017). Policymakers could help improve the Latina and Latino pathway to the PhD and into academia by helping four-year HSIs—and even community colleges—develop programs to help students develop researcher identities and to strategically apply to doctorate programs that can support faculty career aspirations. Such programs could include outreach to groups (older students, first-generation students, Latinas) who often do not earn doctorates from VHRUs.

The finding about Latinas is consistent with prior qualitative work about the challenges that Latinas face based on their intersecting identities—that is, being women and being Mexican American (Espino, Muñoz, & Kiyama, 2010). Espino (2016) incorporates narratives and consejos in her qualitative work to explain how Latinas are counseled to pursue higher education but within certain limits. Latina PhDs described how after they “received their undergraduate degrees, the pressures to conform to traditional female heteronormative social roles as daughter, wife, and mother became more apparent” (Espino, 2016, p. 200). Latinas were counseled that “good daughter[s] . . . would live near family” (Espino, 2016, p. 200). While families encouraged “freedom to study” they discouraged “freedom to leave the family unit in pursuit of professional goals” (Espino, 2016, p. 201). Espino’s findings mirrored prior studies that found that women’s options for pursuing doctorates were limited because they were less mobile for family, career, other reasons (Grimes & Morris, 1997; Warnock & Appel, 2012). Although Latinas made up a majority of social science PhD earners during the 2000s, they often did not earn their terminal degrees from the most research-intensive universities.

This study provides evidence to suggest that HSIs are an important part of the pathway for Latinas and Latinos to earn the doctorate, but their alumni who earn doctorates tend to do so at less-research-intensive universities. This may be concerning in terms of research and policy efforts that focus on increasing diversity among the nation’s higher education faculty members. A university’s research-profile is an important part of the doctoral environment that is related to advising, post-graduation career plans, and socialization. Doctoral students at the most research-intensive universities often receive mentoring and research opportunities that prepare them to be competitive in the faculty job market (e.g., Antony, 2002; Austin & McDaniels, 2006; Bedeian et al., 2010; Burris, 2004; Ehrenberg et al., 2007; Ferrales & Fine, 2005; Sweitzer, 2009; Wulff & Austin, 2004). If HSI alumni who earn doctorates are missing those experiences, then they may tend not to plan to work in academia (Fernandez, 2019). Of course, a VHRU is not a perfect place for Latina and Latino doctoral students. Even when Latinas and Latinos pursue doctorates at VHRUs, they must still navigate “institutional actors and structures that are constructed to prohibit or remain indifferent to Mexican American academic achievement” (Espino, 2014, p. 568).

This preliminary study identifies a relationship between students' undergraduate and graduate institutions, and additional research should further investigate the pathway for Latinas and Latinos to earn doctorates and be competitive for faculty careers; increasing faculty diversity will help improve campus racial climates (Fries-Britt et al., 2011) and address the challenges of excessive "race-related service" (Baez, 2000). If scholars and policymakers want to increase the percentages of HSI alumni, women, older students, and those with less-educated parents who earn doctorates at leading research universities, then further research should examine whether selective admissions processes disadvantage these groups of Latinas and Latinos (see e.g., Posselt, 2016, 2018).

When possible, researchers should collect application data from multiple institutions to examine whether HSI alumni, Latinas, and older applicants have lower odds of applying to VHRUs. Ideally, researchers should quantitatively test whether similar applicants (matched on other characteristics) had lower odds of being admitted to VHRUs if they earned the baccalaureate degree from an HSI. Scholars should examine how HSIs, fit into trust networks (Posselt, 2018) and whether it may be needed—or possible—to improve elite faculty members' perceptions of HSIs and their ability to prepare students for graduate education. Additionally, Santiago and colleagues' (2016a, 2016b) argue that more research is needed that focused on HSIs and their resources, relative to other types of institutions. Researchers may examine whether the lack of financial resources at HSIs is related to their students' likelihood of applying to or pursuing doctorate degrees at less-research-intensive schools.

The null finding about attending community college also contributes to the literature and opens opportunities for future research. Traditionally scholars have suggested that community colleges dampen aspirations for additional levels of higher education. This study indicates that doctorates who attended community college went to VHRUs with similar frequency as non-community college students. This is important because Schudde and Goldrick-Rab (2015) suggested that researchers should "highlight the societal benefits of the institutions, rather than focusing on the diversionary effects of community colleges on educational goals, to build support for greater public investment" (p. 38). Community colleges are not just a part of the Latina and Latino pathway to the PhD, they do not appear to divert students to less-research intensive doctoral programs.

As acknowledged in the limitations section, the community college attendance variable in this study could not disaggregate between students who earned associate's degrees and, for example, those who only took a few classes at a community college. Future research may further examine Latinas and Latinos pathways through the community college while *en route* to a doctorate program. The community college aspect draws further attention to the need to examine attendance patterns sequentially. This preliminary study relied on cross-sectional analyses, but future research should examine longitudinal data on students' pathways to doctorate degrees and faculty careers.

Finally, this study did not consider whether earning a master's degree—or where students earned master's degrees—was related to the research intensity of Latinas' and Latinos' doctorate-granting institutions. Future research may quantitatively examine the importance of master's degrees in the Latina and Latino trajectory to the doctorate. At least one study reveals narratives of how master's programs can seem more attainable and how Latinos may be advised to pursue master's degrees to improve their chances of getting funding to pursue doctorates (Espino, 2014).

Avoiding a Deficit-Based Approach

This study examines where Latina and Latino alumni of HSIs earn social science doctorate degrees. I find that HSI alumni tend not to earn doctorates from the nation's leading research universities. However, earning a doctorate from a VHRU should not be seen as a more successful outcome in American graduate education. All of the individuals included in this study were highly

successful by virtue of the fact that they were among the small percentage of Americans who earn doctorate degrees. Their doctoral training prepares them to pursue professional careers and apply their knowledge and research training to address important social problems.

This paper draws sharp distinctions between the nation's universities based on research intensity. However, those distinctions are not meant to be value judgements on those schools or their faculty and students. Without a doubt, VHRUs deserve attention because they trained nearly 60% of Latinas and Latinos who earn social science doctorate degrees. However, 40% of Latina and Latino social scientists earn the doctorate from other types of universities. If less-research-intensive-universities continue to be understudied, then we overlook institutions that contribute to doctoral attainment—and train academic and social leaders—for one of the largest and fastest growing ethnic communities in the country.

Conclusion

Universities with lower research profiles may receive fewer resources, yet without these universities, Latinas and Latinos would likely be even more underrepresented among social scientists. Future research should consider whether policies and resources could be devoted to creating new doctoral programs or expanding enrollments at less-elite universities to help increase the percentage of Latinas and Latinos who earn doctorates, relative to their share of the population. At the same time, increasing access to less-research intensive universities will not address the underrepresentation of Latinas and Latinos in doctoral programs at the nation's leading research universities. When scholars, practitioners, and policymakers conceptualize a Latina-Latino pipeline to the doctorate, they should consider whether that pipeline tends to increase equity throughout the U.S. system of doctoral education—both at different university types and for various subgroups of the Latina and Latino population. Both will be needed to increase the representation of Latinas and Latinos in academia.

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