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Preparing Underrepresented Students of Color for Doctoral Success: The Role of Undergraduate Institutions*

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Abstract

Since the late 1980s, there has been a significant increase in the number of doctoral degrees conferred upon underrepresented minority (URM) students. However, White students still account for the vast majority – approximately 80 percent – of all doctoral degrees conferred in the United States. As education stakeholders seek to diversify the professoriate, an updated examination of the baccalaureate origins of successful URM students is warranted to improve our understanding of where they are best prepared for doctoral degree programs. We used data from the Survey of Earned Doctorates (SED) and the Integrated Postsecondary Education Data System (IPEDS) to identify the baccalaureate origins of African American, Latina/o, and Asian/Pacific Islander students who received doctoral degrees between 1995 and 2005, distinguishing the top ten producing institutions for each racial/ethnic group. Using extant research, we then identified and examined institutional characteristics of those top ten producers. Findings both confirm and build upon past

research showing that institutional characteristics such as sector, racial/ethnic composition, selectivity, and geographic location matter in terms of producing successful URM doctoral students. The implications of the findings are discussed and suggestions for future research are presented for institutions that wish to recruit and retain URM students to their doctoral degree programs.

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Keywords: underrepresented minority, baccalaureate origins, minority-serving institutions

Introduction

Numerous education stakeholders have acknowledged the absence of minority faculty within the academy (Knowles & Harleston, 1997; Moody, 2004; Myers & Turner, 2004; Tierney & Sallee, 2008), an observation that has often been publicly attributed to the small number of doctoral degree recipients of color. Significantly, the number of doctoral degree recipients from American universities has increased by approximately 3.5 percent since 1958, when the Survey of Earned Doctorates (SED) first began collecting data (Hoffer et al., 2006). Commensurate with this overall growth are increases in the number of doctoral degrees conferred upon underrepresented minority¹ students (URM): according to the Integrated Postsecondary Education Data System [IPEDS] (National Center for Education Statistics [NCES], 2009), the number of doctorates attained by Asian/Pacific Islanders, African Americans, Latina/os, and American Indian/Alaskan Natives doubled between the 1980s and 2005 (Schmitt, 2005). In this article, we explore the role of undergraduate institutions in preparing URM students for doctoral success and describe the baccalaureate origins of doctoral degree recipients of color in the United States.

Aggregate descriptive data provide evidence that racial/ethnic diversification of the professoriate is in progress; however, gains by group vary considerably. In the past twenty years the increases in doctoral degree attainment for Asian/Pacific Islanders², Latina/os, African Americans, and Native American/American Indians between 1986 and 2006 were 194, 140, 101, and 19 percent, respectively (Hoffer, Hess, Welch, & Williams, 2007). Thus, while the overall gains seem favorable, it is important to note that certain minority populations are not gaining as quickly as others. Additionally, there remains a substantial gap between the number of URM and White doctoral degree recipients (Hoffer et al., 2007). In fact, although White doctoral degree attainment only increased by three percent between 1986 and 2006 (from 20,640 to 21,280), Whites still represent approximately 80 percent of all doctoral degrees conferred in the United States (Hoffer et al., 2007).

Of note is the reality that the vast majority of doctoral degrees for all racial/ethnic groups are produced at a relatively small number of institutions. Although 417 institutions conferred at least one doctoral degree in 2006, the top ten institutions produced 47 percent of the 45,596 doctoral degree conferred that year (Hoffer et al., 2007). A similar trend exists for URM doctoral degree recipients. Between 2002 and 2006, 30 percent of all doctorates awarded to Asians/Pacific Islanders, 24 percent of doctorates awarded to all Native Americans/American Indians, 21 percent of doctorates awarded to Latina/os, and 18 percent of doctorates awarded to African Americans were granted by just 10 institutions, per ethnic/racial group relatively few (Hoffer et al., 2007).

Along these lines, the gap in doctoral degree attainment between students of color and Whites attending highly selective doctoral degree-granting institutions is particularly wide (Brazziel & Brazziel, 1997; Hood & Freeman, 1995). For example, in 2007, African Americans and Latina/os

¹ Underrepresented minority students are traditionally Black/African American, Hispanic/Latina/o, and Native American/Alaskan Native students; however, Asian/Pacific Islander students are also a numerical minority within the professoriate and thus are considered URMs in this article unless otherwise noted. Also, the following racial/ethnic group descriptors are used interchangeably: Hispanic and Latina/o and Black and African American.

² While research shows differences in postsecondary experiences and outcomes by students identifying as Asian or Pacific Islander identity (e.g., Teranishi, Ceja, Antonio, Allen & McDonough, 2004), most governmental data are collected in such a way that the groups cannot be disaggregated. Despite this limitation, we use the aggregate measure in this analysis and reporting.

each made up only three percent of doctoral degree recipients at Ivy League universities; Asian/Pacific Islanders comprised only six percent (NCES, 2009). This is especially important because research suggests that individuals attending highly selective graduate programs may be more likely to enter academe (Eide, Brewer, & Ehrenberg, 1998).

In sum, the data suggest that the increase in URMs receiving doctoral degrees has improved the academy's opportunities to diversify, making more URMs *eligible* for faculty positions than ever before. Yet despite the consistent, albeit small, progress in the number of URMs receiving doctoral degrees, challenges remain in converting those URM doctoral degree recipients into faculty members, which has implications for education as well as public policy.

Additionally, although research points to the importance of the doctoral student experience in shaping aspirations and qualifications for the professoriate (e.g., Golde, 2000; Nettles, 1990), the baccalaureate origins of URMs remain important considering that URM doctoral degree recipients receive their bachelor's degrees at relatively few undergraduate institutions. For example, many African American and Latina/o doctoral degree recipients attended demographically unique undergraduate institutions (i.e., historically Black colleges and universities (HBCUs) or Hispanic-serving institutions (HSIs)), which represent fewer than 10 percent of all postsecondary institutions nationwide (Solórzano, 1994, 1995). This suggests that, while the doctoral experience is important, earlier aspects of the educational pipeline also play a significant role in diversifying the professoriate. Further, this clustering of baccalaureate origins is problematic, as it may constrict access to doctoral degrees and the professoriate for URMs who do not attend these institutions. As such, identifying institutions that successfully prepare URMs for doctoral degrees and faculty positions is critical to supporting initiatives that seek to diversify academia, as well as facilitating revision of URM recruitment and retention strategies.

Purpose of the Study

Efforts to diversify the professoriate have generated multiple strands of research. While there has been considerable attention toward specific institutions that produce the largest number of doctoral degrees, this varies widely with regard to time period, race/ethnicity, and field of study. Initially the research on baccalaureate origins focused on individuals obtaining science doctorates (Tidball & Kistiakowsky, 1976), with attention toward female doctoral degree recipients. For example, early works like Tidball's (1986a, 1986b), focused on natural science doctorates and the medical field, identified that women's only colleges were extremely important in the production of female doctoral degree recipients. In addition, there was consideration of African American scientists' baccalaureate origins (Pearson & Pearson, 1985), where the focus was on HBCU contributions to diversity among scientific scholars. While these two bodies of research were important, they focused primarily on providing empirical support for the continued existence of HBCUs and women's only colleges. This collective body of research provided validation to these unique institutions beyond anecdotes, which has been, and continues to be, important with regard to accountability and policy-making.

For doctoral students of color, there is a small but growing body of literature on their experiences, and in some cases there is research on their baccalaureate origins. Although the larger knowledge base contributes to our understanding of URM doctoral students, there remains relatively little recent information about the undergraduate institutions URM doctoral degree recipients attend and how these institutions prepare URM students for post-baccalaureate success. Considering that doctoral degree recipients are most eligible for faculty roles, updated knowledge on their baccalaureate origins could enhance URM graduate recruitment and retention efforts, ultimately changing the racial and ethnic demographic of the professoriate. In addition, an approach that moves

beyond simply noting the incontrovertible success of women only and minority-serving institutions (MSIs³) is especially important.

The current study builds upon on research examining the baccalaureate origins of doctoral degree recipients of color (Solórzano, 1994, 1995; Wolf-Wendel, 1998; Wolf-Wendel, Baker, & Morphew, 2000). The earlier work focused on the baccalaureate origins of URM students in the Science, Technology, Engineering, and Mathematics (STEM) fields (e.g., Tidball, 1986a, 1986b; Solórzano, 1994, 1995), or women (e.g., Wolf-Wendel, 1998; Wolf-Wendel et al., 2000). As described above, much of this research emphasizes student experiences at HBCUs, HSIs, and women's colleges (Brazziel, 1983; Pearson & Pearson, 1985; Tidball, 1986a, 1986b; Wolf-Wendel, 1998; Wolf-Wendel et al., 2000). Although celebrating the achievements of minority-serving and women's colleges is important, less attention has been given to the clustering of URM baccalaureate origins and doctoral degree access in general, which is critical to understanding which institutions (or types of institutions) best prepare URM students for doctoral success in diverse academic disciplines. While STEM-related research is also informative (e.g., Brazziel & Brazziel, 1997; MacLachlan, 2006; Perna et al., 2009; Salters, 1997; Solórzano, 1994, 1995; Wyche & Frierson, 1990). URM students in the STEM fields represented only 27 percent of all doctorates awarded and 45 percent of doctorates awarded to U.S. citizens in 2006 (National Science Foundation, Division of Science Resources Statistics, 2007). Furthermore, the research on baccalaureate origins by and large excludes Asian/Pacific Islander doctoral students, an underrepresented group in academe, but among the fastest growing racial/ethnic populations in the United States and postsecondary institutions. As such, this inquiry on URM baccalaureate origins is unique in that it incorporates recent data and employs a broader lens to examine the baccalaureate origins of URM doctoral students with respect to ethnicity/race, gender, and academic discipline.

To understand the role of undergraduate institutions in preparing URM students for doctoral success, our study explored the following questions: What are the baccalaureate origins of doctoral degree recipients of color? Specifically, what institutions are the top ten producers of African American, Asian/Pacific Islander, and Latina/o doctoral degree recipients between 1995 and 2005? We chose to examine the top ten producers intentionally, as we aimed to identify a limited number of institutions that have played an important role in producing recent URM doctoral degree recipients without overwhelming our descriptive consideration of institutional characteristics. Given that, our second research question was, what are the common characteristics of these institutions that potentially contribute to the higher rates of URM doctoral degree attainment?

Literature Review

As noted above, available research on URM doctoral recipients' baccalaureate origins is extremely limited in scope, which is problematic as URM doctoral degree recipients often attend the same handful of undergraduate institutions. If scholars and institutional leaders have a better understanding of what types of institutions or institutional structures may promote URM doctoral success, there would be benefits to the myriad institutions seeking to promote faculty diversity. While some studies successfully identify underrepresented doctoral recipients' undergraduate institutions, few comprehensively examine the characteristics of these schools. In effect, the lack of continuous research and information on the top doctoral-producing institutions for URM students may contribute to the slow diversification of the professoriate.

³ Minority serving institutions include historically Black colleges and universities (HBCUs), Hispanic serving institutions (HSIs), Tribal colleges and universities (TCUs), Asian American and Native American Pacific Islander serving institutions (AANAPISIs) as noted by the Department of Education: <http://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

According to Solórzano (1994, 1995) and the National Science Foundation (1996), URM doctoral graduates in the STEM fields tend to have earned undergraduate degrees from specialized and comprehensive institutions (i.e., HBCUs), while White doctoral graduates tend to have undergraduate diplomas from research universities. These findings suggest a counter-intuitive understanding of student exposure to doctoral education and research; namely, that although attending research universities is one way for URMs in STEM to gain exposure to doctoral education and research, such exposure may not be sufficient to support their doctoral degree pursuit and entrée to the STEM professoriate.

Rather than focusing exclusively on URM STEM doctoral degree recipients, Wolf-Wendel (1998) identified the role of institutional characteristics in the baccalaureate origins of successful Latina, White, and African American women doctoral degree recipients. Institutional racial and gender composition were the most important characteristics, though there was variation across groups. For example, women's only colleges were an important predictor of doctoral success for White and African American women; however, HSIs were more important for successful Latina doctoral degree recipients (Wolf-Wendel, 1998). Wolf-Wendel and colleagues' later work (2000) showed that HBCUs, HSIs, and women's colleges were more efficient in producing female doctoral degree recipients than coeducational historically White institutions (HWIs). This research employed a production-function framework to examine the role of institutional characteristics, ultimately finding that more specialized institutions are most efficient in producing women doctorates, but that "baccalaureate origins cannot be directly linked to resources at the undergraduate institution" (Wolf-Wendel et al., 2000, p. 180). These findings allude to the significance of gender combined with ethnicity/race during students' pursuit of higher education, an issue noted by other educational researchers (e.g., Barajas & Pierce, 2001; Lundy-Wagner & Gasman, 2012). Beyond that, the finding that institutional resources may not be relevant to the baccalaureate origins of female doctoral degree recipients seems contradictory considering their inclusion in bachelor's degree completion research (e.g., Titus, 2006) and persistent trends in the baccalaureate origins research with regard to HBCUs, HSIs, and women only colleges in particular (see Tidball, 1986a, 196b or Pearson & Pearson, 1985).

Brazziel (1983) adds geography to the list of characteristics affecting URM baccalaureate institution choice, claiming that undergraduate institutions located in states with high numbers of Black residents are frequent producers of African American doctoral students. This finding is supported in Solórzano's (1994, 1995) research on Chicana/os and African Americans in STEM. This concept is not surprising, given the historical and geographic origins of Black and Latina/o migration and the locale of HBCUs and HSIs, respectively (Gasman, Baez, & Turner, 2008). However, it is an important factor to consider in our study because geographical context is one way to "highlight the existence of potential problems with mainstream, coeducational institutions" (Wolf-Wendel, 1998, p. 177) – especially those pertaining to postsecondary access and race relations.

Several researchers have also commented on the selectivity of URM doctoral students' undergraduate institutions, noting that White and Asian/Pacific Islander students often attend more selective universities than African Americans and Latina/os (Nettles & Millet, 1999; Wolf-Wendel, 1998; Wolf-Wendel et al., 2000). This is also not surprising given the role of standardized admissions tests in competitive college admissions and the way scores vary by ethnicity/race. Since baccalaureate selectivity/academic reputation is one of many constructs used in doctoral admissions, and elite institutions tend to produce more faculty members (Eide et al., 1998), there may be institution-level barriers to diversifying the academy even before URMs enter graduate school.

Despite these important literary contributions, none of these existing studies offers a holistic view of URM doctoral recipients' undergraduate institutions, and all are limited in terms of disaggregation by race/ethnicity, gender, or academic discipline. In addition, most of these studies fail to acknowledge how access to doctoral degrees by URMs who do not attend these top-producing

institutions at the undergraduate level may be limited. These weaknesses speak to the need for a broader, more comprehensive study of URM baccalaureate origins – not only to enhance doctoral recruitment and retention efforts that could substantially diversify the professoriate, but also to ensure that URM students of all genders, studying in multiple academic disciplines, and attending various baccalaureate institutions have equal opportunity and preparation for doctoral success.

As noted previously, there is also research that shows URMs often lack the appropriate socialization to pursue graduate school and faculty roles (Davidson & Foster-Johnson, 2001; Davis, 2008; Dedrick & Watson, 2002; Gasman, Hirschfeld, & Vultaggio, 2008; Valvaerde & Rodriguez, 2002). Therefore, our literature review briefly incorporates studies of students' undergraduate and graduate experiences, particularly those related to socialization. At the undergraduate level, several studies highlight URM students' feelings of alienation and academic isolation (Benton, 2005; Bristow, 2005; DeSousa & Kuh, 1996; Gasman, Gerstl-Pepin, Anderson-Thompkins, Rasheed, & Hathaway, 2004). This is detrimental in terms of formal exposure to research and teaching assistantships as well as informal norms of graduate life, all of which are critical success factors for doctoral students, particularly those aspiring to faculty ranks. Benton's (2005) findings also indicate that African American students experience a lack of adequate mentorship, especially from same-race faculty members, who are also underrepresented in the academy; others report similar findings (e.g., Guiffrida, 2005). This notion of mentoring is crucial to doctoral student success and the attainment of faculty roles, as mentoring provides significant socialization into the norms, expectations, and challenges of the academy – particularly for URMs (Austin & McDaniels, 2006; Gardner, 2008; Taylor & Antony, 2000). Comparatively, it is important to note that other researchers have found positive mentoring relationships between URM undergraduates and their faculty mentors (Maton & Hrabowski, 2004).

At the doctoral level, many studies report feelings of academic isolation and insufficient faculty mentoring similar to those experienced by undergraduate students of color (Abraham & Jacobs, 1999; Cheatham & Phelps, 1995; Ellis, 2001; Gasman et al., 2008; Golde, 2000; Gonzalez, 2006; Herzig, 2004; Payton, 2004). Salters' (1997) findings indicate that African American, Asian/Pacific Islander, and Latina/o doctoral students receive fewer teaching and research assistantships than their White counterparts. Along these lines, studies have shown that foregone research and teaching opportunities for URMs can limit their scholarship and/or persistence, which are necessary for progression into faculty roles (Antonio, 2002; Ellis, 2001; Margolis & Romero, 1998). On a broader scale, students of color in Gardner's (2008) study of chemistry and history doctoral candidates reported "a general lack of satisfaction in their overall experiences," with the researcher citing several examples of underrepresented students not fitting "the typical mold" of socialization practices, which are generally geared towards Whites (p. 132).

In contrast, some scholars underscore URM doctoral students' positive experiences, including involvement in research and emotional support from faculty members as well as administrators (Cheatham & Phelps, 1995; Dixon-Reeves, 2003; Nettles, 1990; Solórzano, 1995; Walker, Wright, & Hanley, 2001). Again, these types of experiences are not only important for doctoral students' academic success, but for their socialization into the norms of the academy (Austin & McDaniels, 2006; Gardner, 2008). Notably, research on URM students' undergraduate socialization is sparse in comparison to that of their doctoral counterparts, which stresses the importance of conducting research with these issues in the background.

It is also important to note that research on URM doctoral students frequently excludes Asians/Pacific Islanders. Not only are Asians/Pacific Islanders one of the fastest growing populations in the United States and American higher education (College Board, 2008; U.S. Census Bureau, 2009), they are also among the fastest growing populations of doctoral degree recipients (Hoffer et al., 2007). Although Asian/Pacific Islanders are not always considered "underrepresented," the data confirm that in the academy, they are indeed a minority (Bradburn & Sikora,

2002; NCES, 2009). In 2006, Asian/Pacific Islanders represented approximately six percent of doctoral degree recipients, and only seven percent of American college students. Besides this, research shows that demographic characteristics of the Asian/Pacific Islander population are often skewed by the more socioeconomically dominant ethnic groups, leaving Asians/Pacific Islanders from lower-income groups at a disadvantage for outreach and support (Teranishi et al., 2004). Thus, the omission of Asians/Pacific Islanders may perpetuate stereotypes that these students face few, if any, barriers to postsecondary success and entrance to the academy (College Board, 2008, Teranishi et al., 2004). Thus, including this particular population in our study will provide a baseline from which to begin more robust consideration of URM doctoral degree recipients and their baccalaureate origins.

In general, the research on baccalaureate origins of doctoral degree recipients is quite varied. This body of literature was initially focused on identifying the most efficient institutions, especially with regard to the production of scientists. Extra attention was afforded to institutions that played an important role in women's and African American's doctoral degree receipt. This research is mostly descriptive and lacks a dominant theoretical approach. In terms of the limited research on institutional characteristics in predictive modeling of baccalaureate origins, scholars often focus on 'production' or efficiency. Although these perspectives are appropriately used, they have failed to move this body of research forward analytically. That is, existing research seems most concerned with supporting women only institutions and MSIs.

More recent research on baccalaureate origins is similarly focused and situated, although scholars interested in doctoral students of color and their baccalaureate origins also include attention to Latina/o students, not just African Americans. In addition, while descriptive statistics continue to play a role in the literature, some research also uses inferential statistics to identify the contribution of institutional characteristics. Besides the continued importance of women only and MSIs, the limited research on baccalaureate origins of URMs and institutional characteristics is somewhat thin, though there are trends specific to ethnicity/race. Another significant weakness of the extant knowledge base is a lack of ongoing research related to the baccalaureate origins of URMs who receive doctoral degrees. Socio-historical context seems especially important in those articles highlighting the role of women only colleges and MSIs, but could also be applied to the consideration of institutional characteristics that are instrumental in preparing URMs for doctoral degrees (e.g., geography). Finally, while the use of socialization theory and concepts like mentoring are informative on the individual-level, there may be value in utilizing them to analyze characteristics of institutions that produce high numbers of URM doctoral degree recipients'.

Methodology

Numerous existing databases inform our understanding of student- and institution-level characteristics that promote URM matriculation into doctoral programs. Descriptive statistics of two extant data sets were used to explore our research questions.

To understand the role of undergraduate institutions in preparing URM students for doctoral success, first we identified institutions that have produced the largest number of doctoral recipients of color. Specifically, we used the educational histories component of the Survey of Earned Doctorates (SED) (<http://www.sedsurvey.org/Pages/home.aspx>) to identify the baccalaureate origins of URM doctoral degree recipients between 1995 and 2005. The SED is a federal agency survey conducted by the National Opinion Research Center that gathers annual information from new U.S. doctoral graduates. Analysis of the SED data helped us identify specific institutions that produced larger numbers of URM doctoral degree recipients. Notably, the SED separated the data we examined into three racial categories for non-Whites: African American, Latina/o, and Asian/Pacific Islander. Thus, these are the racial categories we employed throughout our study. (Although Native American/Alaskan Native students are considered URM students in this study,

privacy issues precluded availability and subsequent analysis of the SED for this racial/ethnic group, and thus their inclusion in the analyses.)

Using the racial categories defined by SED, we identified the top 10 URM doctoral degree-producing institutions for each racial category (African American, Latino/a, and Asian/Pacific Islander). Overall, our review of the SED data yielded 26 distinct institutions among the 30 total institutions identified as top-producing URM doctoral graduates (see Table 1 for a list of the institutions, including the three that emerged in multiple ethnic/racial categories).

Table 1. Top 30 African American, Latina/o, and Asian/Pacific Islander Doctoral Producing Institution

	Top 10 African American	Top 10 Latina/o	Top 10 Asian/Pacific Islander
1	Howard University	University of Puerto Rico Piedras	University of California Berkeley*
2	Spelman College	University of Puerto Rico Mayaguez	University of California Los Angeles*
3	Florida A&M University	University of California Los Angeles*	Massachusetts Institute of Technology
4	Hampton University	University of Texas Austin	Harvard University
5	Southern University A&M College	Florida International University	University of California San Diego
6	Jackson State University	University of Texas El Paso	Cornell University
7	Morehouse College	Harvard University	Stanford University
8	University of Michigan Ann Arbor*	University of Florida	University of Hawaii Manoa
9	North Carolina A&T University	University of New Mexico	University of Michigan Ann Arbor*
10	University of California Berkeley*	University of Arizona	University of California Davis

Source: Survey of Earned Doctorates (2009)

Note: "*" indicates this institution is on more than one list.

After identifying the top 10 undergraduate institutions that produced the largest numbers of URM doctoral recipients between 1995 and 2005 for each ethnic/racial group, we turned to our second research question and examined distinctive and shared characteristics of these institutions. We used extant research on baccalaureate origins and data from the Integrated Postsecondary Education Data System (IPEDS) to identify institutional characteristics for the descriptive review. Sponsored by the U. S. Department of Education, IPEDS surveys provide data about enrollment, completion, faculty, staff, and finance for all postsecondary educational institutions nationwide (Schmitt, 2005).

The institutional characteristics we examined from IPEDS were by and large similar to those found in the literature on baccalaureate origins of URMs and student success more broadly (e.g., control type, total undergraduate enrollment overall and disaggregated by ethnicity/race, Carnegie Classification⁴, in- and out-of-state tuition, number of full time equivalent students, selectivity (based on average entering SAT composite scores), and degree of urbanicity). From the undergraduate enrollment data we calculated the percent of African American, Asian, Latina/o, and White students to better contextualize student body ethnic/racial diversity. We also considered institutional data pertaining to institutional capacity to support students from 2005, specifically

⁴ The Carnegie Classification is a standard framework used to identify comparable institutions based on mission, research, sector, and other characteristics. For more information, see:

<http://classifications.carnegiefoundation.org/>.

percent of students receiving any financial aid, amount of aid allocated to Pell-eligible⁵ students, percent of undergraduates with Pell grants, total scholarship money granted, percent of undergraduates taking out loans, and average loan amount. In addition, we considered whether an institution was a minority-serving institution (MSI), if so, the specific type of MSI (i.e., HBCU, HSI, or Asian-serving institution (ASI) or Asian American and Native American Pacific Islander-serving institution (AANAPISI)), and geographical region. Upon constructing our database, we ran simple descriptive statistics to identify similarities and differences within the group of top producing institutions with the most relevant data presented in Table 2.

Table 2. Overview of the top producers of African American, Latina/o and Asian/Pacific Islander doctoral students

[Note: This table is in three parts.

The numbers in the first column refer to the institution named in Part 1 of the table.]

Table 2 – Part 1

	Institution Name	Control	Total Enrollment	Undergraduate Enrollment	Median SAT	MSI status
1	University of Arizona	Public	27532	14503	1100	No
2	University of California-Berkeley	Public	23269	12337	1320	Yes
3	University of California-Davis	Public	21356	12056	1175	No
4	University of California-Los Angeles	Public	25328	13947	1280	Yes
5	University of California-San Diego	Public	17505	9105	1270	No
6	Howard University	Private	6971	4531	1090	Yes
7	Florida Agricultural & Mechanical University	Public	10853	6128	985	Yes
8	Florida International University	Public	25971	14669	1125	Yes
9	University of Florida	Public	33639	17696	1220	No
10	Morehouse College	Private	2729	0	1050	Yes
11	Spelman College	Private	2138	2138	1080	Yes
12	University of Hawaii at Manoa	Public	12054	6721	1080	Yes
13	Southern University and A&M College	Public	7472	4381	NA	Yes
14	Harvard University	Private	9637	4848	1485	No
15	Massachusetts Institute of Technology	Private	4213	1763	1485	No
16	University of Michigan-Ann Arbor	Public	24547	12388	1294	No
17	Jackson State University	Public	5741	3521	NA	Yes
18	University of New Mexico-Main Campus	Public	16441	9348	NA	No
19	Cornell University-Endowed Colleges	Private	8587	3644	1400	No
20	North Carolina Agricultural & Technical St University	Public	7331	3776	890	Yes
21	University of Texas at Austin	Public	38609	19513	1210	No
22	University of Texas at El Paso	Public	13642	7421	NA	Yes
23	Hampton University	Private	4965	3056	1030	Yes
24	University of Puerto Rico-Mayaguez	Public	11351	5702	1228.5	Yes

⁵ The Pell grant program provides grants primarily to high school graduates in certificate or degree-granting programs that are U.S. citizens and considered low-income based on the Free Application for Federal Student Aid. See <http://studentaid.ed.gov/eligibility#basic-eligibility-criteria>.

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25	University of Puerto Rico-Rio Piedras Campus	Public	17787	11995	NA	Yes
26	Stanford University	Private	7279	3682	1455	No

Source: IPEDS (2008)

Notes:

NA - Information not available

MSI - Minority-serving institution status is based on history or demography per <http://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

Table 2 – Part 2

	% White	% Black	% Latina/o	Carnegie Classification	% Asian/Pacific Islander	Pell Amount	Scholarship Amount
1	52.7%	2.8%	14.4%	Doctoral/Research Universities--Extensive	5.7%	\$13,238,504	\$77,277,179
2	53.0%	3.7%	9.3%	Doctoral/Research Universities--Extensive	40.6%	\$15,582,000	\$118,258,000
3	56.5%	2.7%	10.0%	Doctoral/Research Universities--Extensive	35.4%	\$13,351,000	\$59,073,000
4	55.1%	3.7%	14.0%	Doctoral/Research Universities--Extensive	37.5%	\$19,842,000	\$119,243,000
5	52.0%	1.2%	9.6%	Doctoral/Research Universities--Extensive	37.8%	\$11,429,000	\$56,236,000
6	65.0%	68.7%	0.5%	Doctoral/Research Universities--Extensive	0.6%	\$5,358,128	\$30,303,200
7	56.5%	95.1%	0.8%	Master's Colleges and Universities I	0.5%	\$11,144,020	\$32,630,228
8	56.5%	13.9%	54.7%	Doctoral/Research Universities--Extensive	3.8%	\$15,058,652	\$36,341,108
9	52.6%	7.9%	10.6%	Doctoral/Research Universities--Extensive	6.7%	\$15,159,000	\$55,798,000
10	0.0%	95.2%	0.2%	Baccalaureate Colleges--Liberal Arts	0.1%	\$21,349,702	\$12,366,889
11	100.0%	96.4%	0.1%	Baccalaureate Colleges--Liberal Arts	0.1%	\$1,413,513	\$5,547,341
12	55.8%	0.8%	1.7%	Doctoral/Research Universities--Extensive	70.7%	\$5,931,114	\$9,614,411
13	58.6%	97.5%	0.0%	Master's Colleges and Universities I	0.6%	\$12,300,575	\$18,155,632
14	50.3%	6.7%	6.6%	Doctoral/Research Universities--Extensive	13.8%	\$1,332,000	\$127,677,000
15	41.8%	6.1%	11.2%	Doctoral/Research Universities--Extensive	27.8%	\$1,176,000	\$129,804,000
16	50.5%	7.8%	4.2%	Doctoral/Research Universities--Extensive	12.3%	\$6,172,044	\$162,431,446
17	61.3%	97.5%	0.1%	Doctoral/Research Universities--Intensive	0.2%	\$10,313,500	\$19,887,603
18	56.9%	2.7%	33.1%	Doctoral/Research Universities--Extensive	3.5%	\$15,939,898	\$46,939,472
19	42.4%	4.5%	5.6%	Doctoral/Research Universities--Extensive	19.7%	\$5,378,296	\$73,879,480
20	51.5%	91.7%	0.5%	Master's Colleges and Universities I	0.8%	\$7,292,468	\$15,501,382
21	50.5%	3.5%	13.6%	Doctoral/Research Universities--Extensive	15.9%	\$14,076,698	\$104,436,032
22	54.4%	2.4%	72.5%	Doctoral/Research Universities--Intensive	1.2%	\$13,206,431	\$31,940,526
23	61.6%	94.8%	0.6%	Master's Colleges and Universities I	0.4%	\$3,233,928	\$17,599,694
24	50.2%	0.0%	100.0%	Master's Colleges and Universities I	0.0%	\$19,290,115	\$21,264,310
25	67.4%	0.0%	99.9%	Doctoral/Research Universities--Intensive	0.0%	\$26,689,367	\$30,056,588
26	50.6%	7.9%	9.9%	Doctoral/Research Universities--Extensive	23.2%	\$1,790,202	\$91,671,175

Table 2 – Part 3

	% Undergraduates Receiving Financial Aid	% Undergraduates Receiving Federal Aid	% Undergraduates Receiving Loans	Average Undergraduate Loan Amount	2005 In-state cost	2005 Out-of-state cost	Degree of Urbanicity
1	65	23	29	\$5,414	\$12,060	\$19,926	Large city
2	67	29	38	\$3,878	\$16,944	\$28,018	Mid-size city
3	64	22	36	\$2,994	\$15,982	\$27,056	Mid-size city
4	64	30	39	\$3,233	\$16,558	\$27,632	Large city
5	62	27	40	\$2,975	\$15,213	\$26,287	Large city
6	66	33	54	\$7,518	\$18,691	\$18,691	Large city
7	77	69	69	\$3,053	\$12,319	\$20,123	Mid-size city
8	79	33	30	\$2,075	\$14,410	\$22,298	Large city
9	98	18	25	\$3,057	\$11,290	\$19,178	Mid-size city
10	96	29	61	\$2,727	\$25,414	\$25,414	Large city
11	NA	NA	NA	NA	\$23,448	\$23,448	Large city
12	43	18	21	\$2,909	\$11,415	\$17,895	Large city
13	97	75	11	\$2,625	\$7,940	\$13,732	Urban fringe of mid-size city
14	75	23	34	\$3,051	\$36,650	\$36,650	Mid-size city
15	78	20	NA	NA	\$37,460	\$37,460	Mid-size city
16	77	14	32	\$4,166	\$15,753	\$30,463	Mid-size city
17	94	73	84	\$3,002	\$11,758	\$15,928	Urban fringe of mid-size city
18	95	23	19	\$1,212	\$11,809	\$20,207	Large city
19	70	14	42	\$6,038	\$36,434	\$36,434	Large town
20	85	49	72	\$6,682	\$9,909	\$17,831	Mid-size city
21	53	15	31	\$3,343	\$12,861	\$19,191	Large city
22	68	49	19	\$2,208	\$10,322	\$15,426	Large city
23	59	31	49	\$5,156	\$18,965	\$18,965	Mid-size city
24	71	69	8	\$2,354	NA	NA	Not assigned
25	61	58	2	\$2,625	\$8,710	\$10,390	Not assigned
26	75	11	27	\$3,750	\$37,026	\$37,026	Urban fringe of large city

Limitations

Though this study is based on analysis of two data sources, several limitations should be noted. First, in this study the use of descriptive data alone provides an account of URM students who have finished college that completed a doctoral degree by 2005. That said, we do not include URM students who attempted, but had not completed, the requirements of a doctoral degree by 2005. Although this approach is appropriate given our research questions, descriptive statistics do not provide any explanation of the relative importance of each institution or institutional characteristics in eventually producing URM students who receive doctoral degrees. Second, aggregate data from the SED and IPEDS provides a broad understanding of baccalaureate origins of URM students, masking potentially significant differences in factors contributing to doctoral degree attainment within the racial/ethnic groups and across institutions as well as academic programs. However, since the pur-

pose of this study is to identify institutions that have produced high numbers of doctoral recipients of color and their common characteristics, we feel that the use of raw, aggregate data is sufficient at this starting point. Third, while we focus on 26 institutions that have been top-producers of URM doctoral students, other institutions are also successful at preparing URM students for doctoral work. Thus, not only could this study be expanded in future inquiries, but it could incorporate a comparison group. Additional research on this topic might consider the baccalaureate origins of White students, or even URM doctoral students whose baccalaureate origins were not among the top 10 institutions for their respective racial/ethnic group. Finally, the unrestricted SED data set does not include Native American/American Indian students, which reflects a general weakness of extant URM research, as data and literature about this particular group is sparse. Future research on Native students is essential for policy-makers at the federal, state, regional, or institution-level that often use quantitative data to inform decision-making. Related to this study, collecting data on Native populations would be highly valuable in terms of encouraging more Native American/American Indian participation in academia – particularly in faculty roles.

Findings

As mentioned in the previous section, analysis of the SED data yielded a list of the top 10 doctoral-producing baccalaureate institutions for each predetermined non-White racial/ethnic group (African American, Latina/o, and Asian/Pacific Islander). A list of the 26 institutions that produced the most URM doctoral students can be found in Table 2. As aforementioned, the list reveals some overlap among racial/ethnic groups in terms of their baccalaureate institutions, though the total overlap is relatively small (three institutions).

Table 2 presents an overview of selected institutional characteristics for the 26 institutions, including cost, undergraduate racial/ethnic demographics, Carnegie classification, average median SAT of entering freshmen during the 2004-2005 academic year, and MSI status. Descriptive analysis of the SED and IPEDS data reveals that selective, public and research intensive/extensive institutions are especially common among the top producers; thus, they likely play a large role in the production of URM doctoral students. Of the 26 total schools, eight are private institutions (31%) while the remaining 18 are public (69%). Approximately half of the institutions are considered selective, with average median SAT scores of entering freshmen above 1100; in fact, five institutions (19%) had average median SAT scores above 1300. The vast majority (19/26, 73%) of the institutions are doctoral research intensive/extensive schools, though it is also important to note that liberal arts colleges and master's colleges and universities were also represented. Along these lines, the list in Table 2 includes eight HBCUs, five HSIs and three Asian-serving Institutions (ASIs)⁶, but it also includes 10 predominantly White institutions. There was no apparent trend among the 26 institutions with regard to size of undergraduate enrollment.

Of note is the finding that schools with successful records of sending URM students to doctoral programs are located in areas with relatively high African American, Asian/Pacific Islander, and/or Latina/o populations, such as the Southern states and the Southwest. Five of the 26 (19%) total institutions in Table 2 are located in California and nine (35%) are located in Southern states (i.e., Florida, Georgia, Mississippi, Texas, and Virginia), states that tend to have relatively very large - and in many cases growing - underrepresented minority populations (U.S. Census Bureau, 2009).

⁶ AANAPISIs, or Asian American and Native American Pacific Islander serving institutions are eligible for minority serving status if the student population is 10 percent or more AAPI and if a significant percentage of the students are low-income, per the U.S. Department of Education (2013).

The data also show that the top producers of Asian/Pacific Islander doctoral students, clustered in California and Massachusetts, tend to have larger enrollments (12,000-25,000 students) and more selective undergraduate admissions criteria in terms of average median SAT score. For example, the average median SAT score for the top 10 baccalaureate producers of Asian/Pacific Islander doctoral students was 1325, compared to 1092 and 1235 for top producers of African Americans and Latina/os, respectively (NCES, 2009). The top producers of Latina/o doctoral students also tend to have large enrollments (11,300-26,000), although their selectivity is lower. In contrast, African American doctoral producers tend to have significantly smaller enrollments (2,100-10,800), and their selectivity varies considerably, with some institutions having a high average median SAT scores (1320 – University of California at Berkeley) and others having fairly low average SAT scores (890 – North Carolina Agricultural and Technical State University) (IPEDS, 2009).

With regard to financial support, the data also show important differences in capacity for the 2004-2005 academic year. For example, the average amount of money institutions allocated to Pell-eligible students was \$11 million, but varied from approximately \$1.2 to \$26.7 million at the Massachusetts Institute of Technology and the University of Puerto Rico- Rio Piedras, respectively. With regard to student financial support, we examined data on the students eligible for and receiving financial aid at each institution. Similarly, the average amount of total money spent on scholarships was \$57.8 million, but ranged from \$5.5 to \$162.4 million at Spelman College and University of Michigan, Ann Arbor, respectively. Among the 26 institutions identified in this research, the average percent of undergraduates receiving financial aid was 74 percent, ranging from 43 to 98 percent at the University of Hawaii, Manoa and the University of Florida, respectively. On average, 36 percent of students at these institutions took out loans, and the average loan amount was \$3,585. However, the proportion of students taking out loans ranged from 2 to 84 percent at the University of Puerto Rico, Rio Piedras and Jackson State University, respectively. Further, the range in loan debt burden for that academic year ranged from \$1,212 (University of New Mexico) to \$7,518 (Howard University).

Discussion

The findings of this study show both links to and deviations from the existing literature. In expanding upon Solórzano's (1994, 1995) and Wolf-Wendel's (1998) work, this updated study found that while historically Black college and universities (HBCUs) are significant producers of African American doctoral students in STEM, and small, mostly private institutions in the states of California, Texas, New Mexico, Arizona, and Colorado are significant producers of Chicana/o doctoral students in STEM, these types of institutions are not the sole producers of successful URM doctoral recipients. For URM doctoral degree recipients in all academic fields, HBCUs and HSIs continue to play an important role in preparing African American and Latina/o undergraduates for doctoral success. The role of the three ASIs in preparing Asian/Pacific Islander students for doctoral success is notable; however, the lack of research on this topic prevents further comment. Nonetheless, MSIs – which represent less than 20 percent of all bachelor's degree-granting institutions (IPEDS, 2010) – are indeed exceptional in their ability to provide URM students with the necessary foundation to complete doctoral studies.

Based on our analysis of IPEDS data, the top-URM doctoral producers between 1995 and 2005 tend to be selective, public, research intensive/extensive institutions. While many of these institutions are MSIs (i.e., HBCUs, HSIs, and ASIs), it should be noted that 10 of the 26 schools on our top-producers list are predominantly White institutions. This study also supports Solórzano's (1994, 1995) as well as Brazziel's (1983) work in finding that schools with successful records of sending URM students to doctoral programs are located in areas with relatively high African American, Asian/Pacific Islander, and/or Latina/o populations. These demographic trends reflect

social, historical, economic, and financial constraints (both real and perceived by students and their families), especially as they pertain to institutional and regional culture, and race relations.

The emphasis on geography is important in terms of targeted recruitment of URMs for enrollment in doctoral degree programs. As noted by others, for doctoral institutions looking to increase student body diversity in the short-term, it may be beneficial to extend current outreach efforts to baccalaureate institutions located in areas with large African American, Asian/Pacific Islander, and/or Latina/o populations (Solórzano, 1994, 1995). Longer-term strategies should include focused self-assessment and evaluation of academic departmental, regional, and institutional cultures of these top-producing institutions to find out what, if any, replications are possible to support URMs. Given the variation in URM doctoral success by academic field, in-depth research on academic culture is especially important (see Syverson, 1990). Institutions that are not located in these diverse areas may benefit from similar work that identifies cultures supportive of ensuring that URM pursuit of doctoral degrees.

Unlike Wolf-Wendel's (1998) study, this research did not focus explicitly on gender; however, single-sex institutions comprised two of the top ten baccalaureate origins for African Americans: Morehouse College (all male) and Spelman College (all female). In addition, three of the top ten producers of African American women doctoral degree recipients identified in Wolf-Wendel's (1998) work were also identified in this research: Howard University, Spelman College, and Hampton University. While women of all ethnic/racial groups are still relatively outnumbered in the professoriate, these findings emphasize the importance of pursuing research questions that result in disaggregated data by gender across ethnic/racial groups in order to better characterize success and challenges in promoting doctoral degree attainment and entrée to academe. Similar consideration is needed to examine the clustering in certain academic fields by ethnic/racial and gender groups, especially in light of female-dominated participation in higher education and male-dominated STEM participation throughout the education and workforce pipeline.

Although this analysis was strictly descriptive, some of the data elicit consideration of postsecondary access issues. First, among the top producing institutions for Latina/os is an institution with an open admissions policy. This provides a counterpoint to research on URM success in more selective institutions (e.g., Melguizo, 2008), namely, to build off extant research recognizing the poorly captured mechanisms of success by institutions with little to no selectivity that provides rigorous training for URM students. Second, on average, the top producers for Latina/os provide more money for Pell-eligible students (also and enroll more Pell-eligible students) than the highlighted institutions for African American and Asian/Pacific Islander students in this particular research. This is extremely important in the context of providing lower-income students substantive opportunities for post-baccalaureate and specifically doctoral success. As Jun and Paredes-Collins (2010) note, low-income students may be "unfairly socialized to believe that a bachelor's degree is the highest form of education they can achieve" (p. 234). This is problematic as lower-income students, who are already disadvantaged upon matriculation to college, may be further marginalized by their lack of support for post-baccalaureate academic pursuits in comparison to their higher-income peers. Although this research does not provide empirical evidence of an effect for the following characteristics, it does instigate the importance of considering ethnicity/race, socioeconomic status, citizenship, as well as gender in subsequent research on student success.

Finally, this study is among the first to identify types of baccalaureate institutions that produce large numbers of Asian/Pacific Islander doctoral recipients. This is important because although Asians/Pacific Islanders are sometimes overrepresented among STEM faculty (NSF, 2007), overall, they are underrepresented in the professoriate (Hoffer et al., 2007). Although this research does not disaggregate data by ethnicity for URM doctoral degree recipients, future research should consider ethnicity and geography, especially with regard to Asians, in order to better un-

derstand who should be considered a URM student, how to best support URM students, but also how to craft appropriate recruitment and retention strategies. In fact, an element not examined in this work that may contribute to an institution's ability to produce large numbers of URM doctoral students is faculty willingness to mentor URM students.

Implications, Recommendations, & Conclusion

As described in the opening section, faculty of color are grossly underrepresented at American colleges and universities (Tierney & Sallee, 2008; Trower & Chait, 2002). As a result, not only are these individuals' voices and perspectives largely absent from classrooms and research, but their mentorship is missing from URM students' undergraduate and graduate experiences. Considering that the small number of faculty of color is often attributed to the small number of doctoral degree recipients of color, this study used previous research on the baccalaureate origins of URM doctoral recipients as a springboard for understanding which institutions produced high numbers of URM doctoral degree recipients between 1995 and 2005. Specifically, the aim of this inquiry was to understand the general characteristics of the top ten producers of URM doctoral graduates, including institutional type, enrollment, and selectivity among other qualities, which many authors cite as important in postsecondary persistence and doctoral preparation (Austin & McDaniels, 2006; Crawford, Suarez-Balcazar, Reich, Figert, & Nyden, 1996; Talyor & Anthony, 2000; Weidman, Twale, & Stein, 2001).

Using data from the Survey of Earned Doctorates for the years between 1995 and 2005, we identified the top 10 producers of African American, Latina/o, and Asian/Pacific Islander doctoral students, followed by a descriptive review of their institutional characteristics obtained from IPEDS. Although inferential statistics were not included in this work, descriptive statistics provide an important baseline from which to delve more deeply into future work on the baccalaureate origins of URM doctoral degree recipients. Supporting past research on baccalaureate origins of URMs, our analysis of IPEDS data revealed commonalities in terms of location as well as institutional type that can inform other institutions seeking to recruit URM candidates who are prepared for doctoral work.

The results of this study also have important implications for institutional policy and practice, as well as future research that supports and expands upon existing literature. First, for doctoral degree-granting institutions seeking to increase the diversity of their graduate student body, we recommend expanding recruitment practices to include the types of institutions described above. Graduate admissions representatives could focus outreach efforts to public, doctoral intensive/extensive institutions located in cities and states with large African American, Latina/o, and Asian/Pacific Islander populations. In addition, admissions representatives could also focus doctoral recruitment efforts on institutions with minority-serving status. Given the limitations of this study, we recommend that admissions officers also identify other colleges and universities that display similar institutional qualities as the 26 institutions highlighted, as they account for barely more than one half of one percent of all colleges and universities in the U.S. In essence, knowledge about the type, location, undergraduate demographic composition, and cost of colleges and universities that have been successful at producing URM doctoral students can be valuable for diversifying the professoriate.

Second, the variable size of undergraduate enrollment based on ethnicity/race is especially noteworthy for future work. For example, Asian/Pacific Islander students appear to be better prepared for doctoral success if they attended larger institutions, compared to African American and Latina/o students, who appear better prepared for doctoral success after attending institutions with slightly lower enrollments. In the context of socialization theory, this *may* suggest that compared to Asians, other URMs may receive more mentoring and research opportunities that prepare them for doctoral success by attending smaller institutions. Administrators and faculty hoping to sup-

port URMs capable and interested in doctoral degrees may benefit from creating relatively smaller learning communities that promote undergraduate-faculty mentoring, as well as teaching and research opportunities to boost African American and Latina/o progress to doctoral degree receipt (see Valverde & Rodriguez, 2002).

The role of institutional finance also appears to be related to the production of URM doctoral degree recipients. The findings presented here do not provide direct links to the proportion of low-income students on an institutional campus and successful completion of a doctoral degree, but the prevalence of Pell-eligible students at top producing institutions (especially for Latina/os) is notable and should be examined further. In addition, this highlights the role of institutional resources in supporting students via scholarship, grant, or loan aid, providing only a smattering of information, but the impetus for future research. The framework and findings of the study presented here also call for attention to low-income student postsecondary access and outcomes, considering how ethnicity/race is related, and the implications of finance affects URM baccalaureate origins. Given the growing attention toward the increasing cost of higher education and the implicit cost-benefit analysis necessary for attending graduate school (see Jun & Paredes-Collins, 2010), more attention should be paid to low-income students – many of whom are URMs – and their post-baccalaureate trajectories.

Our findings also suggest that more research is needed to fully understand the educational pathway of URMs. In terms of future inquiry, we offer five recommendations.

First, although this study focused on the characteristics of 26 institutions we found to be the top-producers of African American, Latina/o, and Asian/Pacific Islander doctoral recipients between 1995 and 2005, additional work using updated data and a larger pool of institutions is necessary. Future research should build on the current study by including an even greater number of schools per racial/ethnic category to gain more understanding of what types of institutions best prepare URMs for doctoral success. Consideration of baccalaureate institutional selectivity and size should also be incorporated, as research suggests that these factors may play a trivial *or* non-trivial role based on group membership or academic field. This variation has implications related to URM student access to doctoral education, as well as their doctoral experiences and success. Similar to this study, such research would be valuable to both undergraduate and graduate institutions looking to increase URMs' preparation for doctoral work – and ultimately, their preparation for faculty positions.

Second, while further inquiry about the baccalaureate origins of URM doctoral recipients is essential, research on master's and professional degree programs could also provide important insight on URMs' preparation for doctoral work and faculty roles (see Ulloa & Herrera, 2006 or Walker et al., 2001). Students' pre-doctoral academic experiences may certainly extend beyond the baccalaureate degree and that should be accounted for, where possible. For instance, researchers could examine datasets similar to (and including) the SED and IPEDS to identify institutional characteristics of graduate programs and institutions that prepare URM students for doctoral work.

Third, future qualitative work might build upon research that focuses on socialization theory and mentoring during college among doctoral degree recipients. Holistic qualitative studies on URM pre-doctoral academic socialization would provide valuable insight into this process. As noted earlier, there is very little research on the socialization of URM undergraduates compared to socialization of URM graduate students so additional qualitative work on this topic would enhance current understandings of URM pre-doctoral academic socialization processes (e.g., Valverde & Rodriguez, 2002). Researchers could conduct interviews or focus groups with URM students involved in undergraduate research, or interviews with URM doctoral students to assess if/how they were socialized at their alma maters, and additionally, if/how they are being socialized at the

graduate level for faculty positions. Case studies may also be useful in providing in-depth analysis of how specific programs and institutions prepare URM students for doctoral success (Creswell, 1998; Merriam, 1998). Quantitative work should also attempt to incorporate these well-documented concepts from socialization or production theory, where possible.

Fourth, as indicated throughout this article, research on Native American/American Indian students is noticeably absent from higher education research. The number of Native Americans/American Indians in faculty positions is alarmingly small (Bradburn & Sikora, 2002). In order to increase the number of Native American/American Indian professors, it is vital to understand the baccalaureate origins of this population, especially over time. Although many larger-scale data sets do not include or make public information on Native American/American Indian populations to protect the privacy of the small population, both quantitative data (collected through surveys and other quantitative measures from individuals and institutions) and qualitative data (collected through personal interviews, focus groups, and document review) about Native American/American Indian students' progression from undergraduate to doctoral education is critically needed. Additional research on these and other URM students in non-STEM fields would also be valuable in terms of increasing their academic presence in the arts, humanities, and other disciplinary faculties. Finally, the need for research on student success, broadly defined, must begin to acknowledge intersectionality. That is, work acknowledging variation among all students, and especially URMs by ethnicity/race, gender, socioeconomic status, and citizenship since URMs are quickly becoming a majority in the United States (e.g., Lundy-Wagner, 2012).

Finally, in order to learn more about faculty diversity, and the lack thereof, it may be helpful to focus on structural barriers URM students face throughout the educational pipeline. This would include research on URM doctoral degree recipients who do not attend 'top producers,' as well as identifying changes in academic aspirations, considering how institutions encourage or discourage pursuit of doctoral work through mechanisms like academic advising, financial aid, course sequencing, study abroad opportunities, and internship opportunities.

The study of URM students' baccalaureate origins is essential for improving African American, Latina/o, Asian/Pacific Islander, and Native American/American Indians' presence in the academy. In order to combat the persistently low numbers of faculty of color, identifying successful baccalaureate efforts as well as improving doctoral recruitment/retention strategies is crucial for increasing the number of URMs in the professoriate. While the findings of this study offer insight to the baccalaureate origins of URM doctoral students during one period, ongoing research on this and related topics can generate knowledge that ultimately improves minority students' doctoral success, and in turn, encourages them to take on the roles of faculty members as well as mentors for the next generation of prospective URM doctoral graduates.

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