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PRESERVATION OF EDUCATIONAL INEQUALITY IN DOCTORAL EDUCATION:
Tacit Knowledge, Implicit Bias and University Faculty[*]

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ABSTRACT

Making doctoral education accessible and successful for students from low income, first generation families as well as members of immigrant or specific ethnic groups is a world- wide problem. In the US the traditional explanation for the low numbers of Ph.D. recipients from these groups are lack of preparation, lack of interest and a "leaky pipeline." These alone are not enough to explain disparities. This article argues that the most powerful vehicles of exclusion are tacit knowledge and the implicit bias of faculty and is related to doctoral/faculty socialization. Faculty share the values and prejudices of the broader society and those of their own group—one which in the US is predominately white, male and from well-educated middle class families. Their identity as "faculty" of a particular discipline and as members of a profession legitimizes their capacity to evaluate and judge matters within their discipline and their professional responsibilities. Most faculty tend to believe they are objective and even "scientific" in their judgements. Nonetheless, in the course of their lifetimes they have acquired tacit knowledge within the range of their experiences that can be expressed as "implicit bias" and is now documented. The result may be variable responses to students based on their personal characteristics, not their academic merit. Since faculty are to a great extent similarly socialized into their profession in many countries, this model for understanding a major source of discrimination could be potentially useful beyond the US, even if doctoral training is formally organized differently elsewhere. Faculty everywhere are the gatekeepers.

Keywords: Doctoral Education, Inequality, Faculty, Bias, Underrepresented Groups

In the United States there is a persistent problem of unequal access to higher education arising from the nation's history and exacerbated by changes in population distribution and growing income disparities. Lacking a coherent national educational system, the fifty individual states substantially, although not exclusively, finance and set policy for all levels of schooling. They share a national legal framework, which, among other things, requires all educational institutions to be accessible to every kind of student. The principle of equal educational participation is undermined throughout the country, however, by huge challenges in the early years of schooling which can ensure that pupils are not sufficiently educated, or poorly educated, or not educated at all so that they may never be able to go to college, let alone enter a Ph.D. program (US Government Accountability Office 2016, Reardon 2016, Finn 1991, Kozol 1991). Parental income and education, place of residence, family structure--all affect opportunity for children. But the US is a heterogeneous society in which "race" and national origin interact with family and local circumstances to hinder educational opportunity (Bernardo 2016, Owens 2016, Darling-Hammond 2010, Orfield and Lee 2005).

Continuous immigration means that school systems have to adapt to non-native speakers and work with unfamiliar cultures. As an example, in California 22.3% of pupils are English learners, 42.9% of pupils speak a language other than English at home (California Department of Education 2014). Class, culture and gender also influence educational opportunity within these immigrant groups. Additionally stereotypes, discrimination and bias can be experienced and practiced by most individuals

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throughout US society as these concepts and behaviors are not restricted to white (of European ancestry) men, but rooted in all the group(s) to which individuals belong. This context is of great significance for who gets admitted to a doctoral program, who succeeds, and why.

Research on doctoral education suggests that aside from its challenging character, it has some general characteristics, which affect the success of members of underrepresented groups disproportionately. For this study "underrepresented" includes ethnic minorities (African American/black, Hispanic, Native American, Pacific Islanders), those from uneducated families (first generation college students), and women. The categories often overlap. The first characteristic of doctoral education is the national attrition rate of approximately 50% that might attest to the level of difficulty, but completion rates vary by ethnicity and other factors (Sowell, Zhang, Bell, and Redd. 2008, Lovitts 2001, Bowen and Rudenstine 1992, Litalien 2014). Overall completion rates by group from a relatively limited study by the Council of Graduate Schools (CGS) (Sowell, *op cit.* 2008) provide the following percentages for completion after ten years: whites 55%, Asians 50%, Hispanics 51%, and blacks 47%.

An intimately connected point, however, is that percentages are based on limited studies and may not take into consideration all the relevant variables such as field of study as well as family education and income. For example, in the CGS study 70% of black students earned Ph.D.s in education, but only 31% in mathematics (Sowell 2015). The cohort being measured also makes a difference. A study drawing on similar cohorts of Ph.D. students in the University of California System (UCOP) finds the overall attrition rate to be around 35% and the completion rate for all minorities at 63% in all fields, 57% in physical science (UCOP 2014). Second, as a characteristic of doctoral education, the more prestigious the university the more likely its Ph.D.s will find good employment (Burris, 2004).

It is also more likely that there will be fewer students from underrepresented groups—although certainly not in every case (Clauset, Arbesman and Larremore 2015, Warner and Clauset 2015, Amir and Knauff 2008). Third, national data on doctoral attainment shows that ethnic minority and first generation students are not increasing their portion of degrees and in fact their proportional attainment in relation to population growth and demographic change suggests they are falling behind. First generation recipients, however, are declining in all groups.

Table 1 - Ph.D. Awarded by Ethnicity, US Population, First Generation

A. Ph.D.s Awarded to US Citizens and Permanent Residents 2015

	Total	Am Indian	Asian	Black	Hispanic	White	Other*
No.	35,117	130	3,072	2,281	2,451	25,407	1,776
%	100%	0.37%	8.7%	6.5%	7.8%	72.4%	5.1%

B. US Population by Ethnicity by Percentage 2015

	100%	1.2%	5.4%	13.2%	17.4%	62.1%	2.5%

C. Percentage who were first generation (both parents with a high school diploma or less)

	23%	41%	26.3.%	40%	37.1%	19.7%	23.3%

Source lines A. & C: National Science Foundation (2017) Survey of Earned Doctorates 2015, Table 19, Table 33. www.nsf.gove/statistics/2017/nsf17306/data/tab9.pdf and tab33.pdf : Data for table 33 are ca 2,500 fewer than all degree recipients. Source line B: US Census. www.census.gov/quickfacts/table/RH1125214/00
*Other: People of mixed race, unidentified race

Table 1 demonstrates the extent of disparities in background and achievement among the various groups. US citizen and permanent resident whites (those of European background) constitute 62% of the entire US population, earn the highest percentage (72.4%) of all research doctoral degrees, and have the lowest percentage of parents lacking college degrees

(19.7%). By contrast, "Hispanics," a highly diverse group with origins in Mexico, South and Central America, Spain, and the fastest growing US population group, are currently 17.4% of the US population, earn 7.8% of US doctorates, and 37.1% are first generation. Earning a doctorate by itself is an achievement, but *where* the doctorate is earned is important for post-doctoral opportunity and careers. Doctoral enrollment in the US is concentrated in the top 100 research universities, although there are 432 institutions offering research doctorates (National Science Foundation (NSF) 2017).

Academic leadership tends to be concentrated among the top 20 of the most prestigious universities, hiring Ph.D.s from one another in a circulating pool ensuring the maintenance of elite faculty attitudes and behaviors (Afonso 2013, Burris 2004). In turn, graduates of these universities populate leadership positions throughout American society as professors or academic professionals. Advantage and power accrue more to those who already have it.

Background

Americans use the term race as a distinctly identifiable population historically and currently, although academic discourse tends to use the term "identity group," "minority" or "ethnic minority." The US Census, however, continues to use the term race as a descriptor. Race is also used in terms of the relations among groups—race relations—and particularly its derivative "racism." Racism is associated with views of groups other than one's own as inferior in many dimensions. It is particularly used to describe the hostile, discriminatory, and patronizing attitudes held by whites toward those of non-European descent (Chesler, Lewis, and Crowfoot 2005, Solorzano 1998, Steele and Aronson 1995). These attitudes are embodied in stereotypes about intelligence level, work ethic, morals and many other things. Stereotypes are also held about women in the form of sexism (Serio 2016, Moss-Racusin, Dovidio, et al. 2012); about the poor and uneducated in the form of classism (Giani 2016, Hurst 2012). These stereotypes are deeply imprinted in US society and are held by all groups about other groups. The consequence in society still is that violence, discrimination, and inequities of all kinds are perpetuated on minorities and women. Why these attitudes or stereotypes are held generally reflect the historical development of the United States.

Today the reasons why members of underrepresented groups experience discrimination in access to and completion of higher education draw on many broad explanations which both structure and reflect faculty attitudes. Society in the United States historically and currently is stratified as a whole by class, income and race/ethnicity. Non-European Americans and especially African Americans have been legally segregated in all aspects of life in the seventeen former slave-holding states and practically in most other states until a series of federal laws in the 1950s and 1960s outlawed segregation and made discrimination by race, religion, national origin or gender a federal crime. Attempts at enforcement of the legal framework produced conflict and resistance. This required augmentation of the first set of laws on higher education passed in the 1960s by the Higher Education Amendments of the 1970s, which created the Equal Employment Opportunity Commission (EEOC) among other monitoring and enforcing structures. Attitudes are not changed by legislation, although in the 1960s and 1970s there was a distinct optimism that change could occur as US demographics began to change dramatically and the numbers of those attending college rose significantly (Darling- Hammond 2010). Federal and state governments created many programs to facilitate higher education participation of "minorities" – African Americans, Native Americans, Mexican Americans at the time, now any non-European heritage group—and women, poor and working class students. Higher education was expanding, affordable and the most promising vehicle for social mobility at the time especially for white women.

Access to and success in higher education requires adequate preparation. Rising college enrollments and successful bachelor degree earners were mostly those who attended good high schools with adequate staffing, facilities, and more and better resources. High schools in the US are far from equal, however (Bernardo 2016, Keels 2013). There always were huge discrepancies among state primary and secondary systems. States such as Louisiana and Mississippi, home to large black populations, greatly lagged in overall graduation rates in the 1960s and 1970s at a time when states like Minnesota and California graduated proportionately the highest number of pupils from their mostly white populations. But in the 1970s politics, changing demographics and taxpayer revolts ultimately led to every state experiencing very unequal funding for school districts. Today high schools mostly reflect regional economic disparities with poorer high school districts usually populated by low income, and poorly educated families overlapping with ethnic minorities (Owens 2016, Grusky and MacLean 2016, Sirin 2005). This in turn has intensified unequal access to postsecondary education generally and increased the racial and economic stratification of colleges and universities after the 1980s (Dickerson and Jacobs 2006, Douglass and Thomson 2008).

Since the Supreme Court ruled in 1954 that separate educational facilities for blacks and whites was "inherently unequal," great progress has been made to integrate people from all social and ethnic backgrounds into higher education and employment. At the same time as some states, such as California, have become increasingly diverse, the impact by 2016 is that it now ranks next to Louisiana and Mississippi for overall poor K-12 spending and academic proficiency (Bernardo 2016). Discrimination continues to exist in US society and institutions on the basis of race, sex, class, and in other forms such as disability, sexual

orientation or national origin. Universities have not been able to overcome it within its perimeters despite many committed faculty working to do so, and administrative, faculty and student initiatives to overcome it (McMurtie 2016). Certainly, universities share in the issues of any large organization trying to change, but real change to include members of all minorities and make them successful is very hard to achieve (Schmidt 2016, Bastedo & Gumport, 2003). I would argue that faculty attitudes stemming from social background, academic training and their positions of power and influence within the university are primary obstacles.

Why does this matter? The ramifications of inequality of access and persistence in US higher education extend throughout American society. Higher education is a prerequisite for professional employment and historically has been dominated by men of European heritage. Those earning doctorates and filling faculty positions are still predominantly from this group and predominantly from educated families (NSF 2017, Finkelstein, Conley, and Shuster 2016). However, during the last fifty years the population of the United States has almost reached a point where European-Americans are a minority. A four-year degree is now held to be essential for access to employment paying a living wage. Advanced professional degrees and doctorates are indisputably essential to enter leadership positions in all facets of life requiring specialist knowledge. While bachelor degree attainment has been growing for all groups, indeed more women earn bachelors than men currently, although not in all fields, doctoral attainment for members of ethnic minority and working class students is not proportionately increasing (NSF 2017). Since 1973 doctoral attainment for first generation students has fallen from more than two-thirds in 1963 to less than one-third in 2014 (NSF2 2016). The impact of this situation is that leadership in all aspects of society and the economy is still largely white, male and from a middle class/elite background (Wicks-Lim 2016). It follows from this that faculty, especially professors at prestigious universities, are most commonly white, male and middle class with few faculty of color (Myers 2016, see below)..

Doctoral Education in the United States
Admission to doctoral programs in the United States varies by institution type and size, but most often is made on the basis of a standard set of application materials. These include a form with basic background information, a transcript of all undergraduate and other courses if in a Master's program previously, the Graduate Record Examination (GRE) scores, usually both of the standard mathematics and language sections plus specialized GRE tests such as chemistry, at least one essay on why one is applying and one's preparation, and usually two letters of recommendation. These are most often processed by a central administrative office, often called "the Graduate Division." Often under a Dean or other administrator, Graduate Divisions handle the multitude of processes involved in the admission and tracking of doctoral students—collecting undergraduate transcripts, verifying credentials, processing financial aid, administering health insurance, housing, overseeing institutional requirements for admission and academic progress, etc. depending on the university. This processing usually takes place before applications are sent out to departments. At the most prestigious research universities, graduate admission is most often decided in departments, although frequently administratively in conjunction with the "Graduate Division."

As a centralized administrative unit verifying admission qualifications and subsequently tracking students through their graduate program to degree completion, this form of organization sharply sets off the American doctoral system from those in other countries where decisions about admissions and progress usually are made by the professors directly involved. In the United States, according to the Council of Graduate Schools (CGS), 30% of graduate admissions are handled by department faculty, but CGS research suggests departmental or local admissions do not promote diversity (Kent and McCarthy 2014). Each step in the admissions process opens the door for bias as many faculty are unfamiliar with minority serving institutions as well as small liberal arts colleges and branches of state college systems. They tend to fall back on known entities and use grade point average and GRE scores as a result (Posselt 2015, 2016, Kent and McCarthy 2016). As an interest group for doctoral education, the Council of Graduate Schools advocates for centralized doctoral admissions and holistic review of applications (Kent and McCarthy 2016).

The Shaping of Faculty Judgment
University faculty are a particular case within the professions as they are socialized by their discipline in epistemology, language, attitudes and behaviors which are the explicit and implicit result of training in the discipline itself (Becher and Trowler 2001, Stichweh 1992, Jacobs 2013, Clark 1987). While their intellectual function is defined by their discipline, faculty also have a complex functional role within institutions as that of "professor" and the expected action and behaviors related to it, defined by Bourdieu and others as "habitus," although not all scholars of the professoriate would agree that a professor actually belongs to a profession (Bourdieu 1975, Metzger 1987). This function is exercised in the usually hierarchical organization of colleges and universities in which personal, departmental, and institutional competition for status and "rankings" occurs (Gonzales and Núñez 2014, Beyer, 2016, Cantwell and Taylor 2013, Sutton 2015). At the same time, faculty as such are generally understood to be reflective practitioners of their discipline, masters of explicit knowledge, sensitive to the configuration of their discipline and how that is imparted to students. Less explicit and often unconscious are the internalized stereotypes and preferences about others, which may impact how they interact with students and which, is not necessarily an area of reflection.

Faculty are subject to various forms of socialization, which are likely to influence their behavior as active faculty. The first form of socialization experienced occurs during childhood and beyond instilling a partiality for the values and outlook of the group one belongs to—a phenomenon widely distributed in most societies and known as homophily (McPherson, Smith-Lovin, and Cook 2001). The implicit message often is that one's own group is superior to other groups while it supports unconscious negative attitudes and beliefs about other groups. How groups interact with one another and the behaviors they exhibit can reflect these beliefs, although individuals are often unaware they hold these, and are likely to deny they do so.

In the case of "race relations" as it is called in the US, the domination and power of whites historically meant that "blacks" were considered inferior, particularly intellectually. A consequence was that they were enmeshed in a legal and social system of great cruelty and oppression. Most of the legal and socially legitimizing scaffolding has fallen away, but "racism" as a continued manifestation of these beliefs continues. African Americans are discriminated against in employment, housing, and in many other ways, particularly in the criminal justice system and related policing, although not just by whites. All groups can hold prejudices about other groups as well as take over attitudes and behaviors of socially dominant groups critical of groups perceived as subordinate.

Centuries of exclusion and denigration have also led to internalization of negative stereotypes by members of the discriminated group (Steele 1992, 1995, Goguen 2016). Having Barack Obama, a black president, has not improved how blacks are treated within society and, if anything, has generated a backlash against blacks and members of other minority groups. Why should faculty be exempt from the broader set of explicit and implicit beliefs about African Americans and other minorities?

The second form of socialization shaping faculty attitudes is that experienced during their own doctoral training and induction into their discipline (Becher and Trowler 2001). This results in acquiring an epistemology, language, and method particular to a discipline, a process that shapes their judgement of students and peers. Through this process a kind of consensus is created about what constitutes scholarship and how it is judged, a consensus arising from the particular characteristics of the discipline, those which sets it off from other disciplines and constitutes a "a way of being in the world" as defined by Geertz (Geertz 1983 in Becher and Trowler 2001). This alone imparts authority to academics generally, but especially to those successful academics with a distinguished publishing record and many years in the field. The prestige of the department and the ranking of the university further magnify this. Since highly ranked research institutions train a large number of those who become future faculty, the culture of training is passed down through academic generations and kept very much alive. Faculty exercise substantial power over the fate of students, a power amplified by their prestige and the structure of graduate programs. In doctoral education power has many dimensions: who gets admitted to the program, who is judged to be a promising scholar, who is judged as having an inadequate background to be competitive, and who is perceived as a good "fit" in the department. "Fit" has more than purely academic qualities and concerns cultural capital, broader knowledge of the [essentially bourgeois] world, its manners and habits (Steele 2010).

Faculty in the US are still predominantly white men, although the composition varies greatly by field, status of institutions, and faculty rank (Myers 2016). The distribution of faculty positions, however, has been changing drastically over the last thirty years with the number of full-time tenured or tenure track positions remaining static while the number of contingent faculty both full-and part-time have been growing to the point of greatly exceeding the number of "traditional faculty positions" (Finkelstein, Conley, and Shuster 2016, Myers 2016). Women and faculty of color are more numerous in contingent or adjunct positions and concentrated in non-research institutions with higher teaching responsibilities. Using the analysis of Ben Myers (2016) which draws on all the available statistical sources (US Department of Education, National Science Board, etc.) for faculty distribution, in 2013-2014 out of the 412,115 full-time professors at all Carnegie Classifications of four-year institutions nationally, 75% are white. In the same kind of positions, 5% are African American, 4% are Hispanic.

What is arresting about these percentages is that undergraduate students are far more diverse. Of the nearly 8 million who attend four-year public and private institutions, from 53% to 60% are white, 9% to 15% are black, and 10% to 18% are Hispanic. The lower percentages of minority students are at research universities (Hammond 2014, Dickerson and Jacobs 2006). Likewise the lowest percentage of minority faculty are at research universities. As an example, according to the University of California Accountability Report 2016, the percentage of minority faculty for all UC campuses in the entire UC System is 9%, Harvard is 7%, Yale 6%, Stanford 6%. When broken down by ethnicity, this is a much lower percentage than that of earned doctorates by group. There are many reasons for this discrepancy, among them a generalized perception clearly articulated through the NSF Institutional Transformation Program of bias in faculty hiring (http://www.portal.advance.vt.edu/). Faculty of color also experience bias and discrimination on the job as characterized by Caroline Sotello-Turner as "Bittersweet Success" (Turner and Myers 2000, Eagan and Garvey 2015, Lynch 2016).

Martin Finkelstein and others (2016) argue on the basis of their analysis of the most recent faculty numbers that the percentage of women and American minorities in tenured full-time professorships at research universities has not increased in 20 years. The two top groups most frequently hired in these elite institutions are white men and men with international Ph.D.s. Despite the actual growth of numbers of minority and women Ph.D.s, particularly in biological fields, they are not increasingly found in tenure track positions in top research universities. Aside from international rankings, "top" in the United States is understood to refer to member institutions in the American Association of Universities (AAU), an organization founded in 1900 to establish and sustain standards for doctoral education. Today it has 62 members and its 60 US members (2 are Canadian) award nearly half of all Ph.D.s and 55% of those in science and engineering (AAU website)

Whether male or female, most doctoral faculty are from well-educated backgrounds and tend to resist the idea that they are biased. At the same time there is official and unofficial acknowledgement that these biases exist. The National Academies of Sciences has released several significant reports from "Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering" (2006) to "Strategies for Ensuring Diversity, Inclusion, and Meaningful Participation in Clinical Trials" (2016). Additionally, there are many scholarly studies on perceptions of bias among minority students and faculty. The key breakthrough is the establishment of bias assessment systems such as the IAT (Implicit Association Test) began with Greenwald and McGhee in 1998 (see full list in Brownstein 2016) that has the ability to measure "hidden prejudices" scientifically. It is important to note, however, that measuring or becoming aware of bias does not necessarily mean that behavior changes (Bartlett 2017). National policy as expressed through federal funding agency requirements for "diversity activities" also mandate "bias training" as is now required for several Federal agency review panels, such as the National Science Foundation, National Institutes of Health, etc. Non-profit agencies, foundations, universities and multiple local organizations organize "diversity and bias training" (Kayes 2006) expending great energy and spending billions of dollars to "broaden participation." Such training, however, is not without problems especially if campus guidelines on bias and diversity result in interfering with academic free speech (Jaschik 2016).

The Council of Graduate Schools also has published a set of recommendations "Broadening [Minority] Participation in Graduate Education" (2007) and has been organizing studies of doctoral success and completion with an emphasis on minorities. Overall there have been over fifty years of programs to successfully include members of all minorities in the entire educational spectrum through terminal degree completion. This has been a productive activity only to a point. Minority numbers of earned doctorates have been steadily rising, but very slowly, and are unevenly distributed among disciplines and very far from parity with group population percentages.

Long before someone applies to a doctoral program, faculty judgments have shaped the opportunity of that person and allowed for the potential exercise of bias (Lamont 2009, Axt, Ebersole, and Nosek 2014, Schmidt 2016). After all it is the role of faculty as part of their teaching to encourage, test, evaluate—all forms of assessment, which can help or hinder student progress. However, bias is a tricky subject to discuss with faculty because

1. Many faculty do not believe they are actually biased;

2. The so-called pipeline into higher education for students from uneducated families and for members of ethnic minorities is, as has been frequently commented, full of holes or barriers;

3. Higher education requires an epistemological framework to be successful. By that is meant, as an aspect of implicit knowledge acquisition as an epistemological framework moves from learning a collection of facts—"knowledge-that"—to learning the relationship among things, the why, the context—"learning-how" or "knowledge-how." The latter is the basis of disciplinary knowledge and analytical disciplinary practice (Liccardo, Botsis, and Dominguez-Whitehead 2015).

Children from impoverished families may not develop adequate language skills or skills in the national language if they are children of immigrants, and may grow up in a world of ignorance reinforced by family and social milieu. They may succeed in undergraduate work through application and an interest in learning, do well enough to be admitted to a doctoral program, but be found to "not make the grade" by faculty because of these other deficits. If the student persists in the program he or she can experience isolation, daily denigrating remarks based on negative assumptions about who they are or a lack of attention from key faculty (MacLachlan 2000, 2006). These behaviors fall under "implicit bias."

Tacit Knowledge and Studies of Implicit Bias

Not all those theorizing about tacit knowledge would necessarily agree that it is expressed in the form of implicit bias. There is fairly broad agreement, however, that the basic concept today, is based on Michael Polyani's work (1958), and employed in several disciplinary domains, and in some discussions its philosophical origins derive from Aristotle and Kant (Adlof and Gerund et al., 2015; Collins, 2010; Lam, 2000; Pozzali, 2008; Reber, 1993; Brownstein and Saul, 2016). The concept itself refers to personal knowledge that cannot be articulated or codified, but which may have multiple dimensions. Philosophers, psychologists, neuroscientists, applied sociologists and theorists of practical training in manufacturing and other production organizations all employ the concept in multiple ways. It is also a big part of developmental and educational theory about teaching and learning from birth through adolescents. Perhaps the clearest conclusion about this multiplicity of perspectives is that there is no agreement about the scope of tacit knowledge and its related phenomena tacit learning and implicit learning.

It is not my purpose to review all these discussions. Instead I emphasize the role of tacit knowledge in the social construction of class, religious, ethnic and other identities and how these play out in higher education through the behavior of college and university faculty. My argument is that the tacit knowledge acquired through socialization to membership in one's group(s) lead to implicit beliefs about others which can result in attitudes and behaviors in the university leading to denigration of and discrimination against members of groups not one's own. This has a powerful negative affect on the academic success of students from populations historically excluded from universities such as women, ethnic minority students and those from uneducated backgrounds. The resulting discrimination is expressed in the form of implicit biases in which negative preconceptions can completely exclude or harshly evaluate students from these groups. The problem is exacerbated in the academy by parallel beliefs held by many faculty that they are impartial, do not hold biases, and are fair in their treatment of all students.

There are several current theorists of tacit and implicit knowledge who make the connection to biases and how these affect social and educational relationships. Alexis Shotwell in particular argues that tacit knowledge, tacit knowing or tacit understanding negatively affects such relationships in a recent article in which she claims "that implicit understanding is politically and epistemically salient to race, racism and racial formation and that it can supplement, sharpen and enrich accounts of, among other things, implicit bias (Shotwell, 2015 (p. 169). In a 2014 article she makes a similar intricately argued point about implicit knowledge and the oppression of women (2014). She is hardly alone. Brownstein, et al. (2016) present the case for the need to understand implicit bias from its many dimensions and practices to address its deleterious effects on the quality of human interaction. It is useful to know that philosophical discussions make the case for linking tacit knowledge to implicit bias, but essentially I take as given that tacit knowledge shapes behaviors among members of the university community.

How tacit knowledge might affect teaching and learning at the university level has not been much studied, although there has been substantial discussion on creating "the inclusive classroom." But there has not been much of a parallel discussion of tacit knowledge in relation to university faculty and their multiple tasks. What is occurring is a series of well-structured inquiries into faculty bias in the execution of their student related work. I argue that while faculty may be reflective in relation to their disciplinary research and possibly their teaching, they generally reflect little on the social context in which they teach or on their attitudes, which might affect the success of their students from groups underrepresented in universities. This is a topic of great significance at present as a large proportion of students who pass through the higher education continuum to earn a doctoral degree continue to be and, indeed increasingly are from educated affluent and disproportionately white families in the United States. Germany and other countries have a similar pattern of elite doctoral production. The issue is of critical importance because until leadership in all sectors of society reflects the various groups within that society there will be little social peace.

Implicit Bias, Professors and the University

The terms "bias" and "implicit bias" are currently frequently employed in academic and other settings and is now commonplace in the US. Indeed, it is almost an academic industry with a multitude of bias workshops in the context of various institutional diversity plans supported by individual universities, national organizations, and funding programs. The rationale for organizing often-mandatory workshops for faculty and administrators is the recognition that implicit bias is a major factor in impeding the hiring of women and minority faculty. This is especially the case in the natural and physical sciences where members of these groups earn the lowest number of doctorates in these fields and where the number holding faculty positions is even smaller (WISELI, 2006). The impetus for overcoming bias and discrimination comes from the highest national policy makers out of fear that US science might be losing its competitive and innovative edge as well as a pedagogic and hortatory concern to have the scientific workforce resemble the population at large in its composition.

The research that is the basis for these workshops spans much of the 20th century as philosophers, psychologists and neuroscientists have worked to understand the basis of unintentional or unconscious behavior (Gasgoine, and Thornton, 2013; Brownstein and Saul, 2016). Previously this work was largely known only within the active disciplines, but has moved into much broader acknowledgement as efforts to fashion a truly diverse and fair society have not made all that much headway. As Kang and Lane expressed it in 2010 (Staats, 2013): "At the nexus of social psychology, cognitive psychology, and cognitive neuroscience has emerged a new body of science called 'implicit social cognition' (ISC). This field focuses on mental processes that affect social judgments but operate without conscious awareness or conscious control." The Kirwin Institute at Ohio State University has translated how this operates in society into a research examination of where biases are found (Staats et al., 2016).

A major contribution to the glacial movement in race relations in higher education and the apparent inability to create much of a successful minority pathway into doctoral programs is also related to the partitions among disciplines. It is not overstating the case to say that knowledge that would be helpful for the creation and support of these pathways is itself segregated. Research on race often breaks down to research on one particular group with an understandable logic that stereotypes and individual experience varies by group. Categories overlap significantly without the complexities of embodying them, such as an ethnic minority woman from a working class or impoverished background necessarily getting the same measure of scholarly attention, although "intersectionality" is an approach growing in use. Research in all these areas originate in many academic fields, but when the civil rights movements focused on higher education, studies of various groups were formally segregated in discrete academic departments or programs such as African American Studies, Women's Studies, etc.

Since these new programs created in the 1970s were usually populated by scholarly practitioners of the group under study, their research results were again confined by the departmental separation and very often dismissed by scholars in traditional academic fields. These, particularly, but far from exclusively, included engineering, physical and chemical sciences, mathematics and economics. This all matters because of the issue of legitimacy in knowledge and whether it is acknowledged by mainstream faculty—not just white, male and middle class, and in all traditional academic fields. There is also the phenomenon of C.P. Snow's Two Cultures where the work of one is unintelligible to the other and their respective research methodology suspect. Academic cultures are not just divided, they are hierarchical with, for example, physicists and economists believing they are more prestigious than those in other fields. This situation of imperfect and distributed knowledge makes it difficult for faculty to fully appreciate how they function as gatekeepers to graduate education.

There are studies of doctoral education over many years documenting many aspects, but especially its resistance to change, its dysfunction and its need of reform (Bowen and Rudenstine, 1992; Nettles and Millet, 2006; Fischer, 2010; Wulff and Austin, 2004). Two recent extensive studies, however, capture the gatekeeping effect of faculty on doctorate attainment through the operation of implicit bias. The first of these is by Katherine Milkman, Modupe Akinola and Dolly Chugh, "What happens before? A field experiment exploring how pay and representation differentially shape bias on the pathway into organizations (2015)." The focus is on graduate faculty, the gatekeepers to doctoral education and the entry point for nearly all professions. The authors were interested in understanding faculty by type of doctoral institution, department, salary and faculty gender and ethnicity. They employed identical email inquiries about meeting with the professor to explore doing doctoral research with them at their institution. The emails were signed with names identified with a particular ethnicity: White, black, Hispanic, Indian and Chinese and identifiably male or female. Faculty were selected from 259 mainland universities in the US ranked in US News and World Report's 2010 "Best Colleges." They identified 6,300 doctoral programs with approximately 200,000 faculty, then selected one from each doctoral program yielding 6,548 faculty subjects (p.1683).

The study is structured with the greatest rigor and the reader is referred to the original publication for the authors' methodology and analysis. Their results are of interest here. Their "summary statistics describing the characteristics and behavior of faculty in the 10 different broad academic disciplines in [their] sample" (p. 1690) shows a "discriminatory gap" with the raw average response rate to white males higher than to that of the response rate to minorities and females. Moreover, the gaps in response rates vary in size suggesting "that bias may not be evenly distributed across disciplines." A further analysis shows a correlation between average faculty salary and the size of the discriminatory gap by broad discipline. The gap is also larger at private universities (paying higher salaries) than at public universities.

To summarize some of Milkman et al.'s results by broad discipline from all institutional types: 62% of faculty in Business responded to the email inquiry from women/minorities, but 82% responded to those from white men. 71% of faculty in human services responded to women/minorities, 85% responded to white men. In Engineering and Computer Sciences the proportion was 59% to 69%, Social Sciences 68% to 70%, but Fine Arts had a 16% bias against white males!

This summary is but one among a wealth of findings which carefully dissect the many dimensions of interaction, but two more areas are particularly relevant in the context of implicit bias. The first is what the authors call "counterintuitive findings" that "(a) representation [the presence of the minority group within an organization] does not reduce bias and (b) there are no benefits to women of contacting female faculty nor to black or Hispanic student of contacting same-race faculty." The second has to do with informal decisions such as those made in this study by faculty with limited information about the student inquirer and how such decisions should be partnered with formal processes such as admission to doctoral programs or faculty hiring to overcome the unintended biases in less defined situations (p. 1704).

Formal processes are also affected by implicit bias as I turn to the next study of great interest to my topic. This is Julie Posselt's book, *Inside Graduate Admissions. Merit, Diversity, and Faculty Gatekeeping*, very recently published by Harvard University Press (2016). This is an ethnographic comparative case study designed to explore reasons for the apparent contradiction between diversity as an institutionalized value and continuing inequalities in higher education. Included in Posselt's study are three universities, two public and one private, whose programs ranked in the top 15 nationally. At each she selected 10 departments in established fields in humanities, social sciences and physical/natural sciences. The high ranking is important to ensure a large number of graduate school applicants. In a multi-step process to secure agreement for a department to participate her research involved extensive observation of the admissions committee meetings, faculty training workshops, Skype interviews of applicants, campus visit weekends, and other events related to graduate admissions-type of observation varying by department. Posselt also conducted 86 interviews with admission committee members and related faculty. Again the reader is encouraged to consult her "methodological appendix" for a full description of her research design, implementation and data analysis.

As Milkman et al. documented, disciplinary logics affecting which faculty responded to particular students, Posselt found substantial disciplinary differences in admission practices and agreement levels among the committees. Self-perception is best captured in her observation: "Like other disciplines, how economists represented their values in admissions reveal preferences that were thought of as self-evidently preferable rather than the result of common socialization and professional practice" (p. 76). Likewise, Posselt comments on the prevalence of homophily, but in different dimensions from faculty with, for example, prestigious pedigrees looking most favorably on similar applicants. Other sorts of homophily were less obvious, but she concludes that "reviewer tastes were inextricably from their own identities and experiences, especially their education, social, and national origins" (p.112). Her findings are extensive and nuanced. At issue here is that her extensive study supports my argument that faculty implicit knowledge and biases affect their selection of admitted graduate students.

Despite the institutional rhetoric found in US universities about the value of diversity, in the end Posselt concludes that preferences imply aversions. These are caught up in the admissions process because of "ambiguity aversion," the desire to have internal clarity and order in the criteria of who is admitted. When those with poor GRE scores or otherwise less than stellar credentials raise doubts, going with the demonstrated criteria is favored. Likewise "risk aversion," whether to lower status undergraduate institutions, personalities or to letters of recommendation made the committee decide against a particular individual which they justified by the large investment made in accepted students. Posselt also found a desire for "conflict aversion" within the committee which favored quantified/quantifiable application credentials such as GRE scores, grade point averages, recommendation letter rankings which could be more easily agreed upon.

These two studies demonstrate clearly how faculty biases function to bring in those familiar to them or about whom they hold positive stereotypes while keeping out others. All parties have certainly observed this differential treatment involved in admission and there is a substantial literature about it. Faculty may acknowledge preferences or even biases, but the rationale for admission to a doctoral program rests on judgement about whether the student is prepared, looks like he or she has the appropriate background (on its face, academic background) with interest in the field and often whether the student has a indefinable "spark" of intelligence or innate talent for the work (Leslie, 2015; Attiyah, 1997).
None of this can be discounted since to succeed some of these characteristics need to be present.

At issue is who graduate faculty are. They are experts in a particular field of knowledge as members of a particular discipline, which encompasses many facets of their identity, indeed becomes their identity as Geertz has argued (1983). As Tony Becher and Paul Trowler (2001) put it, they see themselves as members of a particular tribe called history or chemical engineering, which has its own standards for evaluating students and scholars. Tacit knowledge and tacit knowing plays into this in that to be a member one has mastered knowing-that and the epistemology of the discipline expressed in knowing-how. Because this knowledge is both explicit and implicit, faculty make decisions about students which they see as appropriate on the basis of their expert knowledge of their field. Faculty often consider themselves or act as if they are professionals with the expectation that

their judgements will be honored, that their qualifications and appropriate exercise of their academic function secures recognition of their autonomy.

The entire issue of responsible personal behavior of faculty which could derive from being a reflective practitioner about their biases, inclinations and preferences for a certain kind of doctoral student, is clouded by several other factors which to a degree insulate them from reflecting on individual faculty personal responsibility. The ongoing legal and campus fights about "affirmative action" suggest that the administration of the university is the responsible party and students tend to hold the university president responsible (Cole, 2016). This is aided and abetted by:

1. The fashionable hiring of "diversity officers" into central administration often at the level of vice president or vice chancellor and allocating or raising money for "diversity" programs which usually do little for increasing the number of minorities in doctoral programs. Some institutions, however, such as Georgia Tech, have been very successful in greatly increasing the number of African American and women students and faculty;

2. The operation of federal funded grant programs which campuses have won for "increasing [minority] participation," which may or may not increase the number of minorities not just enrolling in doctoral programs, but earning a Ph.D. These tend to be concentrated in STEM fields isolated in individual departments. Another is the NSF Advance Institutional Transformation Program the purpose of which is to increase the number of women (and only incidentally, minority) faculty in STEM disciplines. Generally the program requires a central administration commitment to supporting new hiring and promotion procedures, training in bias (!!) for administrators, deans and chairs and especially search committees, among others.

3. Student frustration with ongoing racism and the experience of discriminatory acts within universities is very vocally expressed in 2016 in ways which tend to play into the idea that university administration is responsible (Cole, 2016; Yared, 2016; Bruni, 2015).

Conclusion

The way in which doctoral education is structured in the US with a semi-monopoly of "top" or highly ranked research universities employing tenured/tenure track professors who are overwhelmingly white and from relatively privileged backgrounds training the next generation of faculty has created a system of homophily in doctoral student selection. Young people at large can be excluded from higher education by virtue of their family circumstances, impoverished schools and discrimination early in the educational system. Those students aspiring to postsecondary education will then be evaluated by faculty during college admissions, college courses and mentoring. By the time they apply to graduate school their opportunities are already shaped not just by their own achievement, but by subtle, implicit judgements made about them along the way.

Admission to a doctoral program is likely to expose them to further biases for or against them. By the time they receive their doctorate students will have acquired the epistemology of their discipline, "knowledge-how" along with the likely absorption or intensification of implicit biases about who is a scholar or a potential scholar. Since the doctoral students from the leading universities are more likely to find employment generally, but most especially at the kinds of institutions training successive generations of doctoral students, implicit biases and habits of mind are likely to be passed on.

This is a deeply worrying situation.

Persistent inequality of participation in doctoral education is a problem which requires truly interdisciplinary approaches to understand its causes in order to diminish it. Increasing equality seems to go against the entrenched organizational interests of the university, those of faculty as a whole and as members of distinct disciplines, and against biases, preferences and stereotypes present throughout society. The university and its inhabitants occupy a unique intellectual space, however, as the site of knowledge creation, critical thinking and reflection. Its internally stratified structure and those of the academic professions mediate against alternative approaches to doctoral admissions.

At the same time, progress has been made in increasing minority doctorate attainment. But the current emphasis on bias recognition and training along with more formal review structures for graduate admission and milestones is only a beginning for doctoral reform. Much, much more is needed to make access and success in postsecondary education successful for all. Until it is, educational inequality will be sustained

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