

Capital, Kinship, & White Privilege

Social & Cultural Influences upon the Minority Doctoral Experience in the Sciences

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Introduction

Globally, many nations link their economic security to their capacity for research and innovation, resulting in an increased emphasis on study in the disciplines of science and engineering (Larédo & Mustar, 2001). In the United States, the diversification of the science and engineering workforce has been and continues to be an urgent goal, critical to maintenance of the research and innovation infrastructure within the nation (Committee on Prospering in the Global Economy of the 21st Century, 2007; National Science Foundation, 2011).

The nation's ability to recruit scientists and engineers from outside its borders has become less assured, and thus the U.S. seeks to significantly increase participation in these career fields from those segments of the nation's population that are presently growing (Committee on Prospering in the Global Economy of the 21st Century, 2007). African Americans, Latinos, and Native Americans taken together represent a third of the U.S. population, and are projected to represent more than 50% by 2050. Yet currently these groups represent only a tenth of the nation's science and engineering workforce (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011; U.S. Census Bureau Report, 2010).

The National Science Foundation, therefore, classifies students of these three races as underrepresented minorities (URMs). When examining the science and engineering educational pipeline that leads to careers in these fields, underrepresentation is most severe at the doctoral level where URMs earned approximately 5% of doctoral degrees in 2006 (Committee on Un-

derrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011). This is the educational level at which acquisition of the specialized knowledge and skills to conduct independent research and innovation occurs.

Since there has been little research about the URM doctoral experience (Holley & Gardner, 2012), we currently have inadequate insight into this severe underrepresentation. What is known is that these minorities have lower enrollment rates in doctoral programs and simultaneously have higher attrition and rates than their White and Asian counterparts (Lovitts, 2001, p. 12).

I present in this article a three-part analysis of The Ronald E. McNair Post-Baccalaureate Achievement Program, my own doctoral experience in a chemistry program, and similar experiences of others URM graduate students found in the literature as examples of the social and cultural structures URMs experience at the doctoral level and the subsequent impact on degree completion.

The purpose of this article is to understand the higher attrition rate of URMs in general, and more specifically in the discipline of science. I will utilize the epistemologies of Bourdieu's (1986/2008) concept of capital, McIntosh's (1988/2004) White privilege, and Fordham's (1988) fictive-kinship to deconstruct the social and cultural structures URMs are presented with in doctoral programs.

Background

The McNair Program

Despite a lack of insight related to the racial disparity in acquisition of doctoral degrees in science, the evidence is unambiguous that this disparity exists, and also that it is persistent despite the targeted, long-term efforts to recruit minorities into advanced study programs in these fields. The ten-year completion rate across all

disciplines is the highest for White students at 55% and the lowest for African Americans at 47% (Council of Graduate Schools, 2009).

There are no data specifically related to completion rates for first-generation students within the doctoral student population, even though first-generation students earn 37% of doctoral degrees in the United States (Hoffer et al., 2002). While this is a primary demographic which the U.S. educational system utilizes in recruitment and preparation efforts, there remains a lack of clarity about the racial characteristics, socio-economic status, and degree completion outcomes of first-generation students.

The McNair Program, however, offers some insight into the success of doctoral program completion within this demographic. Started in 1989 and funded by the U.S. Department of Education (USDE), the McNair Program is present on many college campuses across the nation (USDE, 2012). It targets academically promising undergraduates who are first-generation students from a low-socioeconomic and URM background and seeks to prepare them for doctoral studies through research experiences, mentorships, and a wide range of enrichment activities that would otherwise be unavailable to these students.

This class-based and race-based approach to recruitment has resulted in an approximately 61% URM participation in the McNair Program (McCoy, Wilkinson, & Jackson, 2008, p. 22). In addition to this recruitment approach, the program addresses factors that have long been recognized as necessary to doctoral degree completion, such as access, mentoring/advising, and financial support (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011, pp. 65-129; Gardner, 2010).

The USDE commissioned a longitudinal, descriptive study analyzing McNair participants' related to degree completion,

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discipline choice, job security, finances, gender, and race. The study used self-reported data obtained from phone interviews of over 11,000 participants enrolled in the program from 1989 to 2000. Overall, there was a 10.6% terminal degree completion rate; 6% of those were doctoral degrees and the remaining 4.6% were professional degrees earned primarily in law or medicine.

Further disaggregation of this data revealed race as a strong predictor of doctoral degree completion. Whites, representing 19% of the McNair Program participants during those years, earned over 42% of the doctoral degrees. African Americans, representing 44% of program participants, earned only 26% of the doctoral degrees. Hispanics, representing 25% of McNair Program participants, earned 16% of the doctoral degrees (McCoy et al., 2008, p. 19). The overrepresentation of degree completion by Whites represents the significant effect of being a member of the racially dominant group on the degree completion outcomes of McNair participants.

White and URM participants in the McNair Program share similar family and socio-economic challenges. All program participants are recruited because they are academically promising students from economically difficult backgrounds and they all receive targeted preparation and support towards earning a doctoral degree. However, the significant effect of race on doctoral degree completion reveals that URMs are encountering barriers in their pursuit of a doctoral degree that their White counterparts are less likely to experience.

Little is known about the barriers URMs face in their doctoral programs, the influence these barriers have on how URMs experience their doctoral programs, and the ultimate effect these experiences have on persistence in or attrition from their programs. Even less is known about these barriers and their influences in a science doctoral program.

Personal Experience

I am a first-generation URM from a low-socio-economic background and a former McNair program participant. I left a chemistry doctoral program after one year of encountering a highly dissonant social and cultural environment in my daily interactions in that program.

Three years after this departure, and after earning a master's degree in education elsewhere, I am now pursuing a doctorate in education.

Three Points of Analysis

After exploring the literature I found that my doctoral experiences are not unique. Bourdieu's (1986/2008) writings on forms of capital, McIntosh's (1988/2004) discussion of White privilege, and Fordham's (1988) concept of fictive kinship are epistemologies that have been key for me in deconstructing and explaining the dissonance and crises of self-efficacy reported by other doctoral URMs and which I have experienced personally.

To deconstruct and explain my URM doctoral experience all three of these epistemologies were not only needed, but also needed to be intertwined in order to demonstrate the complexity of the social and cultural structures favoring the dominant racial group which serve as barriers for individuals from minority groups—barriers that are particularly heightened in the sciences.

Accumulating Capital

Internally, I am struggling with wondering if I am smart enough to be here, you know, to run with the more intellectually-driven people around me or people I feel that are very intelligent. Just struggling internally with not believing that I belong in this environment and questioning if it is even necessary for me to pursue a Ph.D. in order to have a successful career or to even feel like I am successful. (Gildersleeve et al., 2011, p. 104)

The concept of capital emerges from economics and is a product of human labor, which enables individuals, groups of individuals, or organizations to acquire social influence (Bourdieu, 1986/2008). Capital is a force that makes everything unequally possible or not, with the possibility or impossibility linked to different types of capital that at a particular moment may contribute to social structure (Bourdieu, 1986/2008).

One of the initial forms of capital that emerges to assist in explaining societal structures is social capital. Jacobs (1965) used the term "social capital" to describe a vital component in the development of relationships within city neighborhoods that ensures their perpetuation. Further use of the term has included understanding the importance of social capital to the individual (Bourdieu 1986/2008; Loury 1977), the development of human capital (Coleman, 1988; Loury, 1977), and its use in policy making (Putnam, 1995, 2000).

Each of these conceptualizations shares the common view that social networks possess value derived from recip-

rocated recognition of membership within those networks (Bourdieu, 1997; Coleman, 1988). Currently, Putnam's and Bourdieu's conceptualizations of social capital are the most widely recognized and are applied in explaining disparities that emerge within organizations and institutions among those identified as having minority status (Cederberg, 2012; Modood, 2004; Nahapiet & Goshal, 1998).

Putnam's conceptualization of social capital has three components: bonding, bridging, and linking. Individuals will bond with others in a specific group, and relationships developed within this group may provide a bridge for forming relationships with others beyond this group. This may eventually lead to development of links to those possessing power, resulting in upward mobility (Putnam, 1995, 2000). While Putnam's concept of social capital works well in explaining many of the social structures within institutions, it fails to include the effects of power and resource disparities on the possibility of achieving mobility (Modood, 2004; Portes, 1998).

Bourdieu's (1986/2008) analysis offers a deeper understanding of the social structures that surround us. He identified three primary forms of capital beyond the economic:

1. Social capital as the collective real and possible resources connected to institutionalized relationships of mutual acquaintances and recognition, i.e., it is dependent on one's group membership.
2. Cultural capital as the characteristics of the mind and body which include cultural values and personal preferences and academic achievements.
3. Symbolic capital related to how we display our achievements and significance to others.

Capital is temporal in nature and needs time to accumulate, to perpetuate, or to expand so that all of its various forms can be converted to economic capital. Correspondingly, the possibility or impossibility of an individual's success is linked to an ability to acquire capital in all of its forms. Therefore, Bourdieu's conceptualization of capital, unlike Putnam's, allows a complex interplay of factors to precipitate or enhance understanding of societal patterns.

Although traditionally and originally designed to address these patterns as a consequence of class disparities, Bourdieu's conceptualization of capital has been made transferable as a means to address differences in educational achievement based on race or ethnicity (May, 1999). Here we

consider Bourdieu's concepts of cultural and social capital as they relate to the opportunities available for URMs to accumulate enough of each kind of capital and thus acquire the institutional rites necessary for success within a science doctoral program.

Cultural capital in its embodied state, which involves the enduring characteristics of the mind and body, accounts for most of the attributes of such capital. As the embodiment of cultural capital, "it implies a labor of inculcation and assimilation, costs time, time which must be invested personally by the investor" (Bourdieu, 1986/2008, p. 283); it cannot be transmitted vicariously, that is, the embodied cultural capital is an intrinsic sense of wealth that must be personally accumulated. The degree of transmission and therefore accumulation is understood as economic capital.

Since cultural capital requires time to be accumulated and assimilated, "maximum free time" enables the harnessing of "maximum cultural capital—and then its capacity...to satisfy the specifically cultural demands" (Bourdieu, 1986/2008, p. 284). Free time is a by-product of economic capital; therefore economic capital is a "pre-condition for the initial accumulation" (Bourdieu, 1986/2008, p. 284). It is unconsolidated and at very early stages accumulated by individuals with these advantages.

I have lived—and continue to live—with this accumulation effect during my academic career. I left my first doctoral program in 2008 and, with much reflection, started a second in 2011. My first experience has deeply informed my second, and while I have lost time I have gained valuable insight. Of the insight gained, there are three aspects that were crucial to my return to the pursuit of a Ph.D. First, that my ideas and approach to problem solving are as valuable as my non-URM peers. Second, that the dissonance and impotence I felt in expressing my ideas in the presence of professors and my non-URM peers was not a reflection on my academic capability. Third, that I was still very driven to earn a Ph.D. and to secure a faculty position in higher education with science as a research focus.

It took two years to realize and internalize these insights and another year to feel confident enough to implement them through a return to a doctoral program. So while time has been lost I have come to believe, to trust, and to be confident in my abilities, thereby creating and building my intrinsic sense of wealth; I have accumulated cultural capital.

The longitudinal analysis of McNair participants may also reflect a similar temporal accumulation effect resulting in a significant increase in the doctoral degree completion rate of McNair participants. With time, participants from the early cohort (1989-1993), if given 20 rather than the standard 10 years, have achieved a doctoral degree completion rate that has more than doubled from 6% to 14.4% (McCoy et al., 2008, p. 29). This additional time needed to build capital makes sense when placed in a context with the historical denial of non-Whites to gain economic capital, the precursor of all other forms of capital.

Non-Whites have been systematically denied opportunities for property ownership, the key marker of wealth within the U.S. (Heller, 2010). Race, therefore, can be used as "the central construct for understanding inequality" (Ladson-Billings & Tate, 1995, p. 50) as it is continually significant in the U.S. when value is placed on property rights rather than human rights. Thus the intersection of race and property can aid in understanding inequity.

Current poverty trends reinforce this theorization nationally, with 27.4% of African Americans and 26.6% of Hispanics classified as poor compared with 9.9% of non-Hispanic Whites (National Poverty Center, 2010). As the U.S. tries to increase its strength as a knowledge-based economy, vertical mobility within academia and the workforce is a significant barrier for African Americans, Hispanics, and Native Americans in the acquisition of wealth as compared to Whites.

Due to this structural barrier preventing past generations of URMs from accumulating economic capital, current generations are unable to buy the free-time necessary for accumulation of cultural capital. A doctoral candidate's success in their program requires a reserve of cultural capital, as they are expected to display a social aptitude aligned with the dominant White, middle/upper class male (Gonzalez, 2006; Stewart & Dottolo, 2005).

The Gatekeepers of Science

Lewis (2003) offers a critique of African Americans in science that much of the literature has ignored:

... how science career attainment is a social process, and the desire of an aspirant is only one factor in the process. An aspiring scientist relies on the judgment and invitation of practicing scientists throughout every phase of the educational and career process. (p. 371)

Bourdieu (1991) offers a similar argument within the capital framework. He points out that within academia scientific capital is separate from social capital, though the two are inextricably linked. The predominantly White practicing scientists, the gatekeepers of the institutional state of cultural capital, will withhold entry to those who they perceive to be lacking a social aptitude on par with their own. Entry becomes a difficult challenge for URMs when Whites deny or take for granted the unearned rewards of Whiteness and assume superior talent and merit for these unearned rewards (McIntosh, 1988/2004). McIntosh (1988/2004) asserts that Whites do not recognize these rewards, as they are "made confident, comfortable, and oblivious, while other groups were likely being made unconfident, uncomfortable, and alienated" (p. 191).

Instead the predominantly White gatekeepers attribute URMs seeming lack of social authority not as a result of structural bias, but rather as a perceived lack of motivation and competency on the part of minority populations (Schumann et al., 1997). This represents a "hostility, distress, and violence" (McIntosh, 1988/2004, p. 191) that Whites have been subtly trained through social interactions to direct toward URMs.

The dissonance and isolation experienced in doctoral programs by URMs (Anthony, 2003; Gildersleeve et al., 2011) is not alleviated for these students, as it is for their White peers who experience similar socio-economic disadvantages, as evidenced in the significantly higher doctoral degree completion rates of White McNair participants, 65% of whom pursue doctoral degrees in the sciences (McCoy et al., 2008, p. 23).

White students from low socio-economic backgrounds, such as those in the McNair Program, will not have the complications that stem from racial bias and through their Whiteness are automatically granted privileges by the gatekeepers of science, privileges that URMs have to earn. This inequitable challenge to earn what is freely given not because of ability, but rather the color of the doctoral candidate's skin, can destabilize URMs' self-efficacy, particularly given the lack of time available to build cultural capital.

Self-efficacy. Self-efficacy is tied to a student's cultural capital and is a term often used as a theme when discussing student attrition and persistence (Antony,

2002; Bandura, 1997). Departure from a doctoral program may be representative of a student's inability to persist due to a lack of self-efficacy. "An efficacy expectation is the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977, p. 193).

Bandura argues that this personally-perceived degree of expectation of success affects whether a person will choose to engage in an environment, will possess coping methods, and ultimately how long they are able to persist within the environment (Bandura, 1977, 1982). Similarly, Bourdieu (1986) argues that the greater a student's intrinsic sense of wealth the greater their belief that they can succeed, and within the academic world this cultural capital is recognized by the bestowing of academic qualifications.

Therefore, the more cultural capital a student accumulates the more it becomes possible, rather than impossible, for she/he to earn the academic qualification being pursued. However, a student's cultural capital is not only dependent upon their economic capital, but also on the social environment in which they interact. Daily interactions with people in our environment are seminal to our knowledge and understanding of the world (Burr, 2003) and the doctoral student working in the environment of a doctoral program is no exception to this.

"As a people we construct our own and each other's identities through our everyday encounters with each other in social interaction" (Burr, 2003, p. 13) and as URM students experience distress that is race-based in their doctoral programs, these social interactions can overwhelm cultural capital and the sense of self-efficacy that probably is—as mine was—fragile.

Making Connections

I haven't had an opportunity to mingle and make meaningful connections with a lot of the other people. I mean, I know everybody there and they know me, face value of just being in that space, in the proximity. But, the research assistantship hasn't done much for me in terms of establishing relationships other than with just my singular advisor just because I guess maybe the project I'm working on doesn't require the others. I don't do any work that is general to the whole department there, just whatever my professor and I are working on; just that interaction there. But it hasn't helped integrate me with everyone else there. (Gildersleeve et al., 2011, p. 101)

Social structures within doctoral pro-

grams are more crucial to student success than financial support (Carlone & Johnson, 2007; Gardner, 2010; Nettles & Millet, 2006; Sweitzer, 2008). To understand causations and correlations within these social structures, Bourdieu conceptualized forms of capital beyond that of economic capital and described those forms with the phrase "the social world is accumulated history" (Bourdieu, 1986 in Biggart, 2008, p. 280).

The strength of an individual's social capital is a reflection of the strength and volume of the individual's network of institutionalized relationships. That is, it reflects the economic, cultural, and symbolic capital of the individual and the individual's group membership. However, the acquisition of a "network of connections is not a natural given, or even a social given, constituted once and for all by an initial act of institution, represented, in the case of the family group, by the genealogical definition of kinship relations, which is the characteristic of a social formation" (Bourdieu, 1986 in Biggart, 2008, p. 286-7).

Rather, connections within the individual's group, their social capital, is a ceaseless "effort at institution, of which institution rites—often wrongly described as rites of passage—mark the essential moments" (Bourdieu, 1986 in Biggart, 2008, p. 287). This effort is necessary to produce and keep long lasting, useful relationships that lead to economic and symbolic capital. Bourdieu (1986 in Biggart, 2008) purports that those individuals with genealogical kinship, who already have experienced success, hold membership within institutions where they have a pre-formed social network that facilitates their institutional rites. He later presents a similar argument specific to science. He argues that scientists need to recognize that their choices are "shaped by social capital controlled by various positions and stances within the field" (Bourdieu, 1991, p. 3).

Whether consciously or unconsciously, scientists regulate the selection of newcomers; entry is strictly reserved for "those who know and recognize the cognitive and evaluative, or implicit and explicit, presuppositions that constitute the fundamental law of the field at the given moment, and who possess the mastery of specific resources necessary for reformulating the questions posed naively by the practical logic of the various social practices, be they scholarly or ordinary," (Bourdieu, 1991, p. 6). These are resources that are defined by the capital possessed.

Two forms of capital. Within science

there are two forms of capital—capital of scientific authority and capital of social authority. Capital of social authority is independent of scientific authority (Bourdieu, 1991). Therefore, despite what may be a significant capital of scientific authority, without sufficient social capital or a "feel for the game" (Bourdieu, 1991, p. 8), an individual may be refused entry into the dominant members' group, which in science is a White, male, middle/upper class dominated group (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011). In this gate-keeping, the dominant members "try to impose the definition of science that best conforms to their specific interest, that is, the one best suited to preserving or increasing their specific capital" (Bourdieu, 1991, p.13).

The prevailing social and cultural capitals that determine the transitory structure of the social world are determined by the dominant group, and the unequal burden that causes most things to be impossible falls upon the minority group. Within the U.S. race is intimately linked to social class with African Americans and Hispanics disproportionately representing the lower-social class (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline et al., 2011; Ladson-Billings & Tate, 1995).

Rites of Passage

Van Gennep's rites of passage theory (as cited in Tinto, 1987) describes three stages a student must undergo in order to gain entry into a new organization: separation, transition, and integration. This theory has been and continues to be used to explain the difficulties URM students face in higher education. However, this model, which places the burden of integration on the student, is based on the assumption that the dominant culture within that organization is welcoming of the person seeking entry (Rendón et al., 2000, p. 139).

In the male, White, upper-middle-class-dominated programs in science there is a heavy burden on the URM student to display behaviors that are not explicit in relation to racial, ethnic, or class factors. Thus building social capital within the program can be a struggle. In my chemistry doctoral experience I felt uncomfortable being in the department when others were present. At the time I could not explain why I felt so perpetually unwelcomed during regular hours, but happy and competent in

my lab after hours. I became tongue-tied when trying to talk to professors and peers about my research, most especially when trying to find common personal ground.

My previous ability to effectively communicate intellectually and to socially bond with others seemed to have inexplicably departed. I became acutely aware of this loss at large gatherings, when inevitably the other two URMs in my cohort and myself, in a program of well over one hundred persons, would always end up together. We found safe harbor with each other, but we never talked about the palpable distress obvious in us. By the two-year mark, all three of us had departed the program.

After describing this phenomenon to a minority faculty member in my current doctoral program he forwarded a publication that allowed me to solve the puzzle and distress that was a significant part of my chemistry doctoral experience. Fordham's concept of fictive kinship (1988) allowed me to more deeply explore the role of social capital in the high-achieving URM academic experience.

Fictive Kinship

Within the fictive kinship framework, high achieving African Americans become isolated from their minority collective identity and assimilate into the dominant culture, thereby becoming raceless (Fordham, 1988). This assimilation, similar in nature to a rites of passage or racelessness, forces a quest for an often elusive alternative fictive kinship that can result in cognitive and emotional dissonance having profound effects on the individual personally and professionally.

The anthropological concept of fictive kinship is "a kinship-like connection between and among persons in a society, not related by blood or marriage, who have maintained essential reciprocal social or economic relationships" (Fordham, 1988, p. 56). It extends politically as a collective social identity concept that the collective is "brother," "sister," "and blood" (Fordham, 1988, p. 56). Further, it is more than skin color as it is a mind-set or world-view that is used to determine membership, if it is sought (Fordham, 1988).

The collective ethos of fictive kinship is challenged when children enter school. Schools compete for their group loyalty. It is a group that does not extend membership to those that tend to display attitudes and behaviors that identify their fictive kinship with the African-American community (Fordham, 1988; 2010). To deal with the conflict that results from the com-

petition for loyalty, students either create a community within school that reflect the collective minority culture—thereby ensuring failure—or isolate themselves from the fictive-kinship system by assimilating into the majority culture where they adopt, consciously or unconsciously, a "raceless persona" (Fordham, 1988, p. 57).

It is the adoption of a raceless persona that can result in internal conflict as the individual strives to achieve upward mobility. This is therefore more prevalent among African Americans who have become successful in the dominant culture. It is a conflict amplified by the denial of opportunity for URMs to accumulate cultural capital.

Within the science doctoral environment, minority students may be unable to form an alternative fictive kinship given the dominant members'—whether intentional or unintentional—effort to reserve membership only to those that reflect and preserve their specific capital (Aikenhead, 2002; Bourdieu, 1991). Forming a network of peers and mentors in the first year is a strong predictor of a doctoral student's persistence in their program and eventual degree completion (Nettles & Millet, 2006; Sweitzer, 2008).

In other words, the opportunity to build social capital through finding an alternative fictive kinship is crucial to doctoral education success. However, the URM student may find it difficult to build this network in such a short time as they simultaneously struggle with a dearth of capital, an undermining of their self-efficacy, and a lack of peers and faculty with whom an alternative fictive kinship can easily be formed.

While I found safe harbor with the two other URMs in my chemistry doctoral program, without a mentor we were left to fend for ourselves. Without guidance, we remained stranded and unable to navigate the social and cultural environment that caused such conflict and confusion for all three of us. An early departure was the only resolution for our circumstance.

In contrast, guidance via a fictive kinship with someone who understands the requirements of membership can not only guide a doctoral student to the outer walls of membership, but give them time to gain and share the knowledge needed to build capital and to decolonize the ideas of White privilege, allowing a progression through the walls of membership.

Alternative fictive kinship. The complexity of the requirements of membership as set by the gatekeepers of science can rarely be navigated alone. An alternate

fictive kinship within one's program, at minimum, provides an experienced voice to offer reassurance and encouragement throughout the process. At its best it is an experienced voice within the discipline who facilitates a series of intellectual conversations and readings that helps transform your view and approach to doctoral education and the discipline you are studying.

I have, in my current doctoral program, experienced the latter for the first time. An African-American professor in my current Ph.D. program, who like me has an undergraduate degree in chemistry and has taught science in the K-12 classroom before pursuing a Ph.D. in education, has been a mentor and his depth and breadth of understanding of the URM experience in science and society, shared through conversations, reading suggestions, including Fordham's work, and follow-up conversations, has been one of my most powerful academic experiences.

I initiated a meeting with him after I was struck by the similarities in our academic pursuits, unknown to me prior to entry into the program. I cannot underscore enough that the boldness of this initiation and the content and candor of my questioning would never have occurred without the accumulation of capital which I developed during my time between doctoral programs.

Contextualization of experiences. Situated within fictive kinship is the individual's experiences and how those inform whether the person chooses to undergo separation from their collective community to form new bonds within the dominant culture. More importantly, contextualization of these experiences using academic epistemologies, such as the ones mentioned in this article, can offer URM doctoral students a deeper understanding of how they can situate themselves within their chosen discipline (Pinar, 1975), thereby experiencing less internal conflict as they seek vertical mobility through academia.

The awareness of the dissonance, the demands of coping, the "impossibilities that make the system both open and restricted," and the disclosure of the mechanism that makes it so, collectively, "may become the first condition of finding oneself" (Szkudlarek, 2010, p. 366) closer to penetrating the membership of the dominant culture.

Conclusion

Rooted in the disciplines' origin, doctoral programs in science have social constructions disproportionately favoring

White males from middle- and upper-class backgrounds. The need to deconstruct how this affects what URMs continue to experience as they work to gain entry into the academy at the highest levels is critical. Without the understanding that will result from such deconstruction, efforts to increase diversity will continue to fail due to unsatisfactory progress towards equity.

The epistemologies of capital, kinship, and White privilege each offer a lens through which to understand how socio-cultural constructs within institutions extend or discourage opportunity for success or upward mobility based on race, class, or ethnicity (Cederberg, 2012; Fordham, 2010; Heller, 2010; Modood, 2004; Nahapiet & Goshal, 1998; Phelan, 2001). These epistemologies can be collectively intertwined to offer a theoretical framework to understand the lack of representation of URMs in science at the doctoral level.

As I read and studied the three epistemologies individually, each offered its own insight into different doctoral experiences. Yet many questions were still left unanswered. Ultimately I found Fordham's work to be the missing puzzle piece, linking the notions of capital and White privilege as they manifest in academia for a URM student. Fordham revealed a depth and complexity to the racialization of the minority experience in science doctoral programs that I have not otherwise found explored in the literature.

I started this discussion in a manner similar to many of the publications I have read in the last year—increased diversity in science is vital to the economic security of the nation and is a problem that urgently needs to be solved. I will, however, end in a manner rarely seen in the literature—the most important reason for understanding the minority science doctoral experience is one of achieving equity for student populations facing unique challenges stemming from institutional deficits in cultural and social aptitude rather than these students' ability in and love of their chosen scientific discipline. This paradigm shift will reflect an increasing understanding of a problem that is complex and urgently needs to be solved.

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