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## IS IT WORTH IT? SCIENCE EDUCATION OF THE TALENTED 2%

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### Abstract

*This essay critiques mismatch theory in science education, a theory supported by opponents of affirmative action who strive to derail efforts to diversify institutions of higher education. Can high-achieving students survive and thrive in an academic environment dominated by their super high-achieving peers? Our research suggests that while there are a variety of nuanced factors that impact an undergraduate's success in certain majors, students of all backgrounds can excel at highly selective universities, given the proper resources and support. [underrepresented minority students, science education, mismatch theory, Duke University]*

### INTRODUCTION

Every spring over three thousand anxious high school students and their parents descend upon Duke University for what we call Blue Devil Days, extravagant recruitment weekends in April that are strategically scheduled when the delicate dogwoods and vibrant redbuds bloom, the fescue is green, and tulips splash the colors of the rainbow across campus like a faceted prism. Students invited to these events have been admitted to Duke, carefully selected from over 30 thousand talented and inspiring applicants. They should, and do, feel very special. The scholars admitted through the early decision program have already committed to Duke, but the majority of those in attendance must make one of the biggest decisions of their lives so far; they must choose between Dartmouth and Duke, Spelman and Duke, or Harvard and Duke.

The stakes are high. Students need to consider financial aid, curriculum requirements, leadership and service opportunities, food, social life, and even how their allergies will react to the pollen count. Increasingly, they are considering mental

health and academic support, opportunities to conduct original research, and intellectual climate. Students are determining if they will succeed at Duke, and how much fun they will or will not have as they engage academic pursuits and explore opportunities to grow as young adults. In short, it comes down to discerning that overused but poignant noun: fit.

The stakes are high for students, but they are high for Duke, too. Blue Devil Days are our opportunity to highlight what makes Duke distinctive by showcasing opportunities for mentored research, civic and global engagement, and interdisciplinary learning. One of the primary roles, however, during these recruitment weekends is to increase yield (Smith-Barrow 2014). Yield is a crude and callus metric that collapses both desirability and prestige by simply dividing the number of students who choose to matriculate by the number of those admitted (Editorial Board 2013).

Deciding between and among colleges and universities is never simple, and there are countless combinations of tangible and intangible factors that determine fit and drive yield. Although it is tough to compete with schools like Brigham Young, Yeshiva, and Harvard, Duke's yield for the class of 2017 was a respectable 45.6%. Although well behind Penn, Brown, and Chicago (Abrams 2013), this was Duke's highest yield in two decades, due, in part, to a complex strategy that includes enhancing the early decision program and enhancing these recruitment events.

During Blue Devil Days, academic departments set up tables in Cameron Indoor Stadium to discuss classes and majors with prospective students, The Global Education Office holds information sessions detailing the opportunities to study abroad, and our financial aid office has a team of counselors to answer specific questions. As dean of Academic Affairs, I kick off the campus visit by addressing over a thousand nervous parents and potential students in the biggest auditorium on campus. My team and I provide an overview of

the curriculum, research opportunities and academic advising. I then open the floor up for the painfully predictable questions regarding how many AP credits transfer, how math placement works, and how to ensure an incoming student gets an air-conditioned room. The more delicate questions come after the presentation, when an awkward line of mostly parents forms to ask what is truly on their mind. They want to know why we do not offer a business major, how lesbian students are treated, and how many natural science and economics classes are graded on a curve. I have grown accustomed to these inquiries, but last spring, one discerning parent asked me a set of distinctive questions.

Sarah, a striking 50-something mother wearing relaxed fit khakis, an olive-green cardigan, and holding a classic Coach clutch, waited for me until just about everyone had left the auditorium. She looked like a professor. As I turned to leave, she literally cornered me and asked if I had time for a quick question. I was thinking that I would do just about anything to yield one more student, so I leaned against the wall, took off my glasses and agreed to hear her out. "My daughter, Anna, wants to be a physician," began Sarah, her tone earnest and pragmatic. "She received a Dewitt Dean scholarship from Spelman College, was accepted at Emory and Vanderbilt, and it is now coming down to Duke or Spelman. I have a small practice as a family therapist in Buckhead and my husband teaches high school history in Atlanta. We were not offered much financial aid here because we make decent money and have been saving all her life for college, but, you know, it's Duke. It costs over \$61,000 a year, which is more than \$100,000 in pretax dollars." As I prepared my response, which would include an overview of the strengths of our pre-health program and the value of investing in her child's future, I stopped short because she looked me dead in the eye and asked, "Is it worth it, is it really worth it?"

She left the specific meaning of "worth" intentionally vague, implying in a single question: Is it worth sending my daughter away from Atlanta? Worth her attending a school with an unforgiving social hierarchy? Worth the money? In one of those surreal moments of "I know, that you know, that I know what you are really trying to ask," she also wanted to know if her well-prepared daughter, who has been labeled "gifted and talented" her entire life, would thrive or just survive the fast-paced science and math curriculum at Duke. She understood that her daughter was

admitted to Duke but wanted to know if she would be accepted at Duke.

I panicked. I was confronted by the fact that while Duke is ranked #28, Spelman is ranked second in the country, bested only by Howard University, as the undergraduate school that sends the most African American students on to successfully complete graduate degrees in science and engineering (Fiegener & Proudfoot 2013:7). Although I was supposed to be promoting Duke, I knew that graduates from HBCUs offer "a comparative advantage in nurturing the self-image, self-esteem, and identity of its graduates," as well as "relatively superior long-run labor market outcomes" (Price et al. 2011:127).

I was also haunted by the specter of the racist and pernicious "mismatch theory" that portends that students admitted to more competitive colleges through affirmative action may do worse academically (and feel worse about themselves as a result) than if they enrolled at less selective colleges that would not have considered their race or ethnicity (Sander & Taylor 2012b). Critics of affirmative action use this theory to argue that eliminating the consideration of race from admissions decisions helps White and Asian applicants, and empowers Black and Latino students (Jaschik 2013).

Sarah knew she threw me a curve ball. For students to thrive and be competitive at Duke, within the pre-health track, they must matriculate with a 4 or 5 on the Advanced Placement Chemistry exam and score a 750 or higher on the Math SAT. Knowing this, I looked up, furrowed my brow, and cocked my head just a little to ask, "How committed and motivated is Anna to becoming a physician, and did she take AP Chemistry?" Sarah explained that she was deeply committed and she earned an A in honors chemistry, but did not take the AP course. Sarah volunteered that Anna had a 650 Math SAT, and noted that this was in the top 2% of all African Americans who took that exam (College Board 2013:1; Magrogan 2013:7).

Despite her success relative to other African American students, I knew that Anna would be up against tough competition should she enroll at Duke. Science education at Duke is comparable to NCAA Division I football and basketball because one has to be ready to compete at a very high level just months after graduating high school. Our football players graduate in June, begin practice in July, and are playing in games with elite athletes by the end of August. Our experience

demonstrates that there is a correlation between Math SAT scores and success in the sciences in the first semester at Duke, primarily because months after graduating from high school, students are thrown into chemistry, multivariable calculus, and biology and must perform at an elite level. For students who are pursuing the pre-health curriculum, the first semester is critical to successive successful semesters. Like our athletes, prospective physicians are expected to perform at a very high level once they arrive on campus and they do not have time to develop talent.

I explained to Sarah that if Anna wants to be competitive as a pre-health student in the top third of her classes, her first year is important, and she will need to participate in study groups and utilize the Academic Resource Center. Anna will have to work really hard, stay focused and disciplined, and immerse herself in science classes and labs. She simply will not have as much time for co-curricular activities like many of her peers.

In the end, Anna did not attend Duke. Perhaps Sarah did not want her to leave Atlanta, the scholarship was a deciding factor, or Anna wanted to be a leader in her science classes and have a more expansive college experience. Given the outcome of this conversation, and the loss of a pre-health African American student to our incoming class, I began to reflect on Duke's efforts to compete with HBCUs and subsequently yield top science and pre-med students. To make science education a high impact learning experience for African Americans, Latinos, American Indians, and Southeast Asians and Pacific Islanders, Duke must interrogate how it integrates its talented 2%. It is also imperative to mitigate how the mismatch discourse unwittingly contributes to what I consider a dangerous and debilitating discussion regarding attrition, or so-called STEM migration.

### **THE TALENTED 2%**

The arena of college admissions is very competitive, and its landscape changes rapidly. The process is politically charged and is a lightning rod for the media and the courts. Deans of Admissions have to be savvy and responsive and Christoph Guttentag, Duke's dean of Undergraduate Admissions, is both. With over 30 thousand applicants for roughly 1,700 spots in each incoming class, Dean Guttentag, and his team, are particularly selective as they sculpt the class. He actually calls it sculpting, like a masterpiece created with precision, creativity, and care. Each student gets a holistic review with an evaluation of the impact

she has made with her talent and opportunities, as well as an assessment of how she will contribute to the institution and community. To punctuate this point, Dean Guttentag often cites the exact number of valedictorians each year that do not get admitted to the university because they were neither interesting nor did anything with their talent.

Diversity at Duke is multifaceted, but amplifying racial and socio-economic diversity is a strategic priority. Duke's president, Richard Brodhead, has stated "an educational environment teeming with a broad range of experiences, backgrounds and viewpoints creates the richest learning outcomes for our students" (Duke Today 2013). To sculpt a stellar student body, President Brodhead explains:

We pay attention to test scores for what they are worth but we know they are an imperfect measure: at the end of the day, Duke's goal is not to reward high test scores, but to recruit and train the level of talent that will make the highest degree of contribution to the university community and our future society. This potential needs to be assessed by many measures, including measures of character, drive, and good use of prior opportunity. [Brodhead 2012].

In terms of forming a diverse incoming class that includes children of alumni and of high capacity donors, poets and writers, math super stars and linebackers, Dean Guttentag remains very discerning in his decisions. However, being selective with applicants from Niobrara County, Wyoming or Coos County, Oregon is different than being selective with applicants from the suburbs of Seattle or Boston. Although about as scientific as "eyeballing," admissions officers pull from the top 2% of admittedly unequal cohorts. Yet, it is guaranteed that each admitted student will be among the best of his peer group. Duke hopefuls just have to be in the top 2%. When amplifying diversity is couched in terms of class or region, athletics or the arts, holistic review seems both logical and practical. After all, an incoming class made up of the top 2% of independent and top-tier public high school students based on academic preparation would be a meritorious and competitive class but not terribly dynamic nor diverse. When race is considered as a facet of a student's identity to enhance campus diversity, something shifts to create anxiety and tension. Race challenges ideas of fundamental fairness and

merit in ways that class, region, and athletic ability do not.

Higher education remains one of the few institutions to keep the door to the American Dream open and highly selective schools swing that door wide open for those who maximized their talent and leveraged opportunities to earn a spot in the incoming class. With a 94% graduation rate, we understand that talents develop, passions ignite, and students discover and identify interests at Duke to succeed in ways they never could have imagined. Once students move to campus, there are countless opportunities to get ahead, get by, or fail—everyone gets a clean slate and a fresh start. Fortunately, just about everyone is academically successful at Duke. High school curriculums are limited and SAT and ACT tests measure a rather narrow band of competencies. With over 40 majors that range from Medieval and Renaissance Studies to Mathematics and over two thousand undergraduate courses per semester, virtually all students at Duke find a course of study in which they can succeed.

Sculpting a class with high-achieving scholars from diverse parts of the country, types of schools, and different socio-economic, religious, and cultural backgrounds creates a dynamic and vibrant scholarly community that produces doctors and lawyers, politicians and statisticians, and professors and preachers, each with a greater appreciation of working with people who are not like themselves. Being able to navigate and negotiate difference and work closely with people with very different worldviews is one of the cherished hallmarks of a liberal arts and sciences education.

Elite college campuses committed to this type of diversity, however, are not kaleidoscopic utopias. They are quintessential American institutions where hegemony and privileging the privileged still structure cultural expectations and the ability to accrue social capital. Meanwhile, racism, class disparities, and gender discrimination and violence shape the experiences of too many students, despite the efforts of well-meaning administrators and faculty.

Selecting from the top 2% of respective cohorts works well because it indexes merit in relative, opposed to absolute, terms. Students find themselves colliding and interacting with different types of high-achieving students. At Duke, the smart but less prepared student from rural Oregon might find she is both good at and has a passion for film theory and cultural studies, while the high achieving, well-prepared student from East Chapel

Hill High might find himself just getting by academically because he is focusing on cultivating extensive social networks. Even well-prepared, highly competitive, and privileged students can drink too much, become victims of disordered eating, get overwhelmed by anxiety or depression, or not have the resilience to overcome setbacks. Struggles with debilitating mental health is the primary reason students do not graduate in 5 years.

Students with very high or perfect standardized test scores are overrepresented among the students on leave and at risk of not graduating. Success, wellness, and excellence follow academic engagement at Duke, not academic achievement in high school (Asher & Stroud Weeks 2012). SAT scores and high school grades are good for indexing relative merit but are not a good predictor of competitive success at Duke over the arc of eight semesters and three summers. The profile of at-risk students at Duke is inverted where the seemingly most competitive and best-prepared students are among the ones at greater risk of not graduating.

#### **THE UNFORGIVING ABSOLUTE RANK**

SAT scores and the rigor of one's high school curriculum do predict success in certain pathways at the very beginning of one's college career. They guide placement in first-semester chemistry and math classes, and first-semester natural science courses launch a student on either a successful or a rocky trajectory in the pre-health or natural science curricula. This is when the top 2% in relative terms becomes an unforgiving and absolute ranking of high school preparation. In "The Role of Ethnicity in Choosing and Leaving Science in Highly Selective Institutions" (1996), Rogers Elliott and A. Christopher Strenta carefully and convincingly explain that competitive position within a cohort of first-year students matters in science education, "noting that a reasonably well-prepared student at an HBCU who would be in a strong competitive position in his or her institution would be in a far less strong one at an elite institution" (684). This is as complicated as employing the "big fish in a little pond" metaphor. Yet, the authors recognize that being perceived as, feeling like, and acting as a leader among one's peers enhances the educational experience and facilitates academic engagement.

The discrepancy in preparation levels becomes obvious at highly selective institutions, however, when students among the top 2% at the Cheyenne-Eagle Butte School in Dewey County, South Dakota are placed alongside students among the

top 2% at the Dalton School, especially because the latter has some of the highest SAT scores in the country (Robinson 2014). On average, the very best students from a small public school in rural South Dakota are just not going to have the same SAT Math scores as the very best students from a private prep school on the Upper East Side. Similarly, the very best African American and Latino students are not going to have the same SAT Math scores as the very best White and Asian students.

According to the College Board, a 750 on the Math SAT falls in the 99+ percentile for African Americans, while the same score is in the 98th percentile for White students and the 87th percentile for Asian students (College Board 2013:1). The score that ranks in the 98th percentile for African American students taking the Math SAT is 650, which ranks in the 84th percentile for white students and the 60th percentile for Asians students. Many of our African American and Latino students are in the 99+ percentile, but so are many of our Asian and white students.

There are racial disparities in the United States that range from wealth and health outcomes to educational opportunities and prison sentences. SAT scores unfortunately reflect the persistent power of racism, historical discrimination, and long-standing racial disparities that cannot be simply controlled for by socio-economic status. The students in the talented 2% who want to pursue science education at Duke find that every fourth student in the incoming class has a near perfect Math or Verbal SAT score and probably half of the students in first-year science classes have perfect or near perfect Math SATs.

The sequencing in the pre-health curriculum is decidedly hierarchical, so where a student starts on that ladder determines how steep and long the climb. For example, one needs proficiency in inorganic chemistry before learning organic chemistry and organic chemistry needs to be understood before learning biochemistry. Conversely, relatively flat majors like public policy and anthropology are different because students learn different types of analysis and methods across domains or regions and there is little to no expectation that students have high school preparation to pursue these subjects.

The problem with the mismatch missionaries who challenge affirmative action and holistic admissions practices is that they generalize the pattern of performance in a narrow swath of natural science classes to the entire curriculum. Richard

Sander and Stuart Taylor, in *Mismatch: How Affirmative Action Hurts Students It's Intended to Help and Why Universities Won't Admit It* (2012), pull together one of the more comprehensive and definitive discussions of how students navigate the aggressive sequencing of natural science courses. They argue that so-called race preferences create

[...] a terrible confluence of forces putting students in classes for which they aren't prepared, causing them to lose confidence and underperform even more while at the same time consolidating the stereotype that they are inherently poor students. And it's easy to see how at each level there are feedback effects that reinforce the self-doubts of all the students who are struggling. [5].

The authors go on to suggest that "mismatch problems are particularly easy to see in technical subjects like science and math" (Sander & Taylor 2012a:5), but just about all of their evidence is drawn from the natural sciences and professional schools that do not have a wide range of possible pathways of study. What mismatch theorists gloss over, but every humanities and social science professor has experienced, is that most students begin focusing on a specific major in the junior year, after two years of exploring what they are good at and find interesting. Anthropology is rarely, if ever, taught in high school and no one, save for maybe one or two students a year, comes to college to be an anthropologist. At the heart of the liberal arts and sciences experience is exploring an array of different fields while discovering one's intellectual passion.

Proponents of mismatch theory exploit a distinctive desire of many young, gifted, and Black students to pursue careers in science and engineering. On a percentage basis, there are more black high school seniors than white seniors attracted to STEM majors (Sander & Taylor 2012a:34). There are probably several explanations, but many students have never considered the vast opportunities to help people, become affluent, or to become a leader with a major like public health, philosophy, visual studies, or archeology.

However, students do not declare a major in high school; they declare at the conclusion of their sophomore year. Based on illusory high school interest, these authors argue that "mismatch causes blacks to abandon these fields at twice the rate of whites," and this one inference is repeated over and over by opponents of affirmative action

(Sander & Taylor 2012b). Proponents of affirmative action follow this same logic and use the same moment in high school to develop mitigation strategies to STEM attrition or abate the crisis of STEM migration. Migration happens through pushes and pulls. There are many high school seniors who grew up watching *Grey's Anatomy* and have a vague idea that they want to be a surgeon (Chang 2014:569). The one that gets pulled away from pursuing math and science because a passion ignites and an aptitude develops for health policy should not be viewed as a loss or victim of attrition. Focusing equally on the pushes and pulls is dangerous and inimical to the philosophy of the liberal arts and sciences.

I am sympathetic and cognizant that we must combat what Richard Tapia calls “the loss of the precious few,” but we must reframe the notion of attrition by focusing on the push factors and facilitating the pull factors (Tapia 2011:36). Students should be encouraged to explore, not irrevocably commit to, the pre-health curriculum or STEM majors. The burden falls to the faculty and administration to successfully recruit underrepresented students to STEM majors. Once students declare a major or commit to the pre-health curriculum, the burden again falls to the faculty and administration to empower students to thrive, not just survive or persist. Highly selective institutions that actively recruit and subsequently yield students among the talented 2% have a responsibility to develop talent and provide a scaffolding mechanism to give these students a shot at success. For the talented 2% that find themselves in the bottom third of that unforgiving absolute rank in the first semester science sequences, Duke turns to a sports analogy. Duke structured an innovative approach that empowers the very best students to be able to compete with the absolute best students in science, math, and the pre-health curriculum—the academic equivalent to the redshirt year (Yeager 2013).

CHEM 99D, SAGE, and the Cardea Fellows program represent a three-pronged, overlapping approach to enhancing the success of the talented 2% who have traditionally struggled in the pre-health curriculum. As a response to findings of an institutional assessment, a new course, CHEM 99D: “Introduction to Chemistry and Chemical Problem Solving,” was introduced 4 years ago to provide a chemistry course for the small percentage (10–15%) but significant number (60–90) of Duke students who are interested in science but do not yet have the

chemistry background or problem-solving skills needed for the more advanced gateway STEM courses. The course is taught in a hybrid format featuring a mix of lecture and collaborative problem-solving exercises.

The SAGE (Science Advancement through Group Engagement) program was developed by the Academic Resource Center (ARC) to increase the success of students in CHEM 99D. Led by an upper-class peer mentor with a tight feedback loop to the ARC, the group engagement offers students the opportunity to participate in additional problem-solving exercises outside of class, while focusing on both course-specific and broader learning skills. The SAGE program continues to offer this support to the students as they move through their first two years of gateway chemistry and biology courses.

The third prong of this approach is the Cardea Fellows program. Each year Duke inducts eighteen pre-health students who place in CHEM 99D into this prestigious fellowship program that fosters an intellectual and academic learning community. Although these students are required to participate in SAGE, they receive preferential advising, housing, and programming. They also take several courses together and form a tight cohort of strong students that navigate the vertical curriculum together while learning how to collaborate to compete.

Results to date suggest that the combination of approaches that make up this redshirt year is indeed leveling the playing field and enhancing the success of this cohort of students (Chang et al. 2014:568). The difference between the academic and athletic redshirt years is that these students take a year to catch up with the super-star freshman, but do not have an additional year of eligibility like the athletes.

#### **MISMATCH MASHUP**

In “Mismatch and the Paternalistic Justification for Selective College Admissions” (2013), Michal Kurlaender and Eric Grodsky challenge anti-affirmative action arguments set forth by Sander and Taylor, and convincingly argue that mismatch theory is a paternal justification to end affirmative action. These authors demonstrate that students who may be considered mismatched are successful at highly selective institutions because these schools have greater resources for academic support and advising, and high-achieving students who are around super high-achieving students step up and reach higher than they would if they were

already at the top of the class at a less selective school.

Scholars continue to build upon and extend *The Shape of the River: Long-Term Consequences of Considering Race in College and University Admissions* (2001) by William G. Bowen and Derek Bok, the most definitive research in support of affirmative action. These authors looked at the added value of attending selective colleges and universities later in life. Focusing mainly on Black students, they found that these students earned more income and advanced degrees and had higher levels of civic engagement than their peers at less selective schools. Moreover, SAT scores held little predictive value of achieving these outcomes later in life.

Mismatch missionaries offer a particularly seductive critique of affirmative action because they simply suggest that students should be matched where they can succeed and be competitive. The discourse has a pro-Black and anti-elitist bent to it because they argue that colleges and universities that are not among the most selective are excellent institutions of higher education. Reproduced as a mashup of a meme and a wish-fulfillment rumor cycle, one 1992 quote from Walter Patillo, Jr., the former chair of the Biology department at North Carolina Central University, gets reproduced in a variety of different ways, venues, and contexts to punctuate this putatively pro-Black message: “The way we see it,” Patillo recounts, “the majority schools are wasting large numbers of good students. They have black students with admissions statistics [that are] very high, tops. But these students wind up majoring in sociology or recreation or get wiped out altogether” (Culotta 1992:1218).

Proponents of the mismatch hypothesis emphasize that Historically Black Colleges and Universities serve African American students well and have been doing so for well over a hundred years. That may have been true in the 1880s or even the 1980s, but as selective White universities have become more diverse, Black students have been able to better navigate and negotiate subtle, micro, and blatant forms of racism, stereotype threat, and discrimination. Faculty and administrators have also become more attentive and responsive to embracing and serving students who contribute to the racial, ethnic, religious, socio-economic, language, sexual, and gender diversity of a campus.

Roland Fryer and Michael Greenstone have generated suggestive research that demonstrates that in the 1970s, students who attended HBCUs

had higher wages and increased probability of graduation relative to their peers who attended predominantly white institutions. They go on to explain, though, that by the 1990s, “there is a substantial wage penalty. In fact, there is a statistically significant 20% decline in the relative wages of HBCU graduates between the two decades” (U.S. Commission on Civil Rights 2010:125). They are convinced that their data demonstrate that now “by some measures HBCU attendance appears to retard black progress” (U.S. Commission on Civil Rights 2010:126). These arguments, however, have been challenged and contradicted (Price et al. 2011; Constantine 1995).

Importantly, Fryer and Greenstone explain that these differences may be relative because predominantly White institutions may have just gotten better at teaching Black students while HBCUs may have stayed about the same. They also note that students who select HBCUs tend to be more attracted to public service, which may contribute to the wage gap. What the authors completely fail to address is that highly selective White institutions are just not that White anymore. Half of Duke’s incoming class, for example, is made up of students of color. Diverse student bodies and responsive faculty and staff are contributing to better outcomes for Black students at selective colleges and universities, a factor that has not been previously considered.

Selective White universities have gotten better at teaching Black and Latino students among the top 2% in the social sciences and humanities, but not so much in the natural sciences. HBCUs still dominate this category. According to the United States Civil Rights Commission, HBCUs

produce a disproportionately high share of African American students who receive [undergraduate] degrees in science, engineering, technology, or mathematics (the “STEM” fields). Although only about 20% of African American college students attend HBCUs, 40 percent of all African American engineers received their degrees from an HBCU. [U.S. Commission on Civil Rights 2010:9]

According to the National Science Foundation, University of Maryland-Baltimore County is the only predominately White institution among the top ten baccalaureate institutions to send African Americans on to successfully complete Ph.Ds in science and engineering, and it is ranked tenth (Feigener & Proudfoot 2013:7). Breaking the top

10 is a direct result of the innovative Myerhoff Scholars Program, designed and implemented by UMBC President Freeman Hrabowski (Myerhoff Scholars Program). The program has been a national model for increasing the ability of students to successfully get into and out of Ph.D programs in the natural sciences.

Although HBCUs generate many more African American students who earn undergraduate degrees with STEM majors, on a percentage basis, the numbers that go on to successfully complete the Ph.D. and MD is lower than historically white schools. Because there are many more Black students enrolled at elite HBCUs than selective White schools, the NSF normalizes this imbalance by calculating an institutional yield ratio. Essentially, they rank the origin schools of science and engineering Ph.Ds based on a yield ratio per 100 African American students. Viewed from this perspective, MIT, Rice, Princeton, Brown and Yale round out the top five, followed by Harvard, Vanderbilt, UMBC, Spelman, and Duke to make up the top ten (Fiegener and Proudfoot 2013:10).

Comparatively though, African Americans pursue advanced training in the sciences as medical students in greater numbers than as graduate students. The Association of American Medical Colleges ranks baccalaureate institutions that produce the most African American physicians and the top four are Xavier, Howard, University of Florida, and Harvard (Association of American Medical Colleges 2012:86). Duke and Stanford are tied for fifth and Spelman, Michigan, UNC, and Yale are tied for seventh. After Xavier and Howard, it is a pretty tight cluster with between 18 and 26 new MDs coming from these schools each year. However, if one normalizes these numbers to calculate the institutional yield ratio, per 100 African American students, the list looks different with Yale on top followed by Stanford, Xavier, Harvard, Duke, Michigan, UNC, Spelman, University of Florida, and finally Howard. When one normalizes these numbers, the seductive anti-elitist and pro-Black argument falls apart because the distribution of research institutions changes, which may explain why opponents of affirmative action do not incorporate this type of analysis into their findings.

Although HBCUs distinguish themselves by producing students who pursue STEM majors as undergraduates, the elite HBCUs excel when it comes to preparing students who successfully complete doctorates in science and medicine. The talented 2% at research universities can

and do succeed, and they succeed well at specific institutions that have addressed the fact that racial disparities do not mitigate merit. Indeed just the opposite, navigating and negotiating racism and discrimination while making it to the top 2% is itself meritorious and worthy of consideration, investment and talent development.

## CONCLUSION

So, to revisit Sarah's initial question: Is it really worth it? The answer that I should have given was an unequivocal "yes." Particularly, if Anna's personality, level of motivation, patience, and resilience could tolerate redshirting for a year to compete with the super-star first-year students who have been preparing for a career as a physician since middle school. However, if Anna wanted to be a leader and be among the best students in her class, my counterpart at Spelman should have also answered "yes" to the question. Anna's decision, like that of so many high school seniors choosing a college to pursue pre-health, is comparable to the options available to really good high school athletes. Is it better to sit on Coach K's bench the first year, getting limited playing time but training with the best players and coach in the country, or is it better to attend a school where playing time during the first year is guaranteed and the student quickly becomes a star? Again, it all comes down to fit.

Although the current mismatch discourse is fueling a renewed debate regarding affirmative action and STEM migration, it is both racist and dangerous to be seduced by it because it assumes that the talented 2% of Latino, African American, and Native American students simply do not belong with the talented 2% of White and Asian students at highly selective universities. Moreover, side stepping the analysis of institutional yield is problematic because it does not consider that these students can and do succeed at different types of schools. Duke and other peer institutions have proven that the talented 2% succeed at highly selective research universities, and succeed in the sciences, so long as the institution structures pathways for success with the support of an encouraging and resourceful faculty and administration.

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