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BLACK BEYOND MEASURE: AN ANTIDEFICIT EXPLORATION OF CULTURAL
CAPITAL WITHIN A NATIONAL SOCIETY OF BLACK ENGINEERS (NSBE) CHAPTER
AT A PREDOMINANTLY WHITE INSTITUTION (PWI)

by

Rhonda Michele Harley

A dissertation submitted in partial fulfillment
of the requirements for the degree of

Doctor of Philosophy

May 2022

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TITLE OF DISSERTATION: BLACK BEYOND MEASURE: AN ANTIDEFICIT
EXPLORATION OF CULTURAL CAPITAL WITHIN A NATIONAL SOCIETY OF BLACK
ENGINEERS (NSBE) CHAPTER AT A PREDOMINANTLY WHITE INSTITUTION (PWI)

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ABSTRACT

Historically, Black students have been excluded from Predominately White institutions (PWI) longer than welcomed to attend and matriculate (Harper et al., 2009). Due to this lack of inclusion, African American students' educational experiences often center on academic disparities, inequality of opportunity, and under-preparedness in career planning within the American education system. While there has been a fair amount of research on the lack of representation of Black students in the engineering disciplines, the heavy focus on quantitative data offers little insight into the unique ways students succeed and overcome institutional and systemic barriers in pursuit of their degree. Undergraduate experiences, for Black students, are not easily quantified solely through enrollment numbers, test scores, grade point averages, and graduation rates.

An emerging approach to understanding the factors contributing to persistence and retention in engineering, particularly at a PWI, is to take an asset-based anti-deficit approach to study Black student success. This qualitative counter storytelling study utilized Yosso's (2005) Community Cultural Wealth (CCW) theoretical framework as a tool to illuminate the resource-rich experiences and community offerings of 12 Black students involved in the student-led National Society of Black Engineers (NSBE) chapter at the University of San Diego (USD). Semi-structured interviews were conducted to identify the variety of ways Black students access, activate, and foster cultural wealth as they navigate a PWI in pursuit of a career in engineering. Study findings show that all six sources of capital outlined in the CCW theoretical framework were deployed, with multiple capitals interacting and influencing each other. Emergent themes highlight the multiple forms of CCW participants used to navigate unwelcoming environments, seek support from critical stakeholders, contribute to the collective community wealth of the

NSBE chapter and advocate for themselves and others. Recommendations and suggestions for further research conclude this study.

DEDICATION

I dedicate this to the student participants who so graciously and bravely shared their stories and journey with me.

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To my parents, Ronald and Donna Harley, I will never be able to express the love and gratitude I have for you in words but know that this dissertation is a manifestation of the cultural capital you both have blessed me with my whole life. Thank you for letting me set up a whole office at your living room table countless times to get this work done. I wrote the majority of this at your house! Your support throughout this entire process is why I can now call myself Dr. Rhonda Harley. Love you!

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To my University of San Diego classmates, colleagues and friends, I thank you for being my right hand in this journey. You all were a part of my day-to-day world and graciously shared in my challenges and successes. I am endlessly grateful that you all are a part of my village. I COULD NOT have done this without you.

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DEFINITIONS

African American/Black – For the sake of this study, Black or African American refers to an individual who self-identifies as having origins in any of the Black racial groups of the African continent. African American and Black will be used interchangeably in this study.

Community Cultural Wealth (CCW) – CCW is a theoretical framework defined as an array of knowledge, skills, abilities, and contacts possessed and used by communities of color to survive and resist macro- and micro-forms of oppression (Yosso, 2005).

National Society of Black Engineers (NSBE) Members – All participants in the study were distinguished according to their status as being currently enrolled undergraduate students who had a paid membership to the NSBE national organization.

Predominantly White Institution (PWI) – A PWI is a college or university where the majority of students enrolled are of White heritage.

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CHAPTER 1

INTRODUCTION

Background of Study

Racial inequality within engineering education has been a longstanding reality in U.S. higher education. National data have suggested an urgent, sustained, comprehensive, intensive, coordinated, and informed national effort is necessary to increase the success of underrepresented minorities in science, technology, engineering, and mathematics (STEM; Dickerson & Zephirin, 2017). Although there has been a fair amount of research on the lack of representation of Black students in engineering, the heavy focus on deficit-based quantitative data offers little insight into the unique ways students navigate higher education institutions and degree attainment.

The National Society of Black Engineers (NSBE, n.d.) provides professional, academic, and leadership support for Black students in engineering programs across the United States. NSBE is an international, nonprofit, student-led organization based in the United States. NSBE is a foundational component of student leadership and professional development for Black engineering students. With the goal of graduating 10,000 Black engineers by 2025, NSBE's (n.d.) mission is to "increase the number of culturally responsible Black Engineers who excel academically, succeed professionally, and positively impact the community" (para. 2). For some students, NSBE can be the only connection to peers who look like them and share a similar academic background and professional goal of pursuing a career in engineering.

Peer-to-peer communities and student organizations are essential for Black student retention, often offering community, agency, and a support network for those who actively engage. Studies of NSBE chapters at predominantly White institution (PWIs) have shown that

Black engineering students who participate in such chapters achieve more equitable outcomes (e.g., graduation rates, internships, employment opportunities) that meet or exceed the total engineering cohort's percentages at their institution (Dickerson & Zephirin, 2017; Ross & McGrade, 2016). Although support for ethnic student organizations is often mentioned in engineering education literature, ethnic student organizations' influence on students' engineering journeys has been understudied (Martin et al., 2016).

Statement of the Problem

The University of San Diego (USD) is a midsized, Catholic, liberal arts, PWI in Southern California. At the time of this study, undergraduate student enrollment was over 5,400, with 600 students enrolled within the engineering school (USD Institutional Research and Planning, 2021). Of those 600, 23 students self-identified as Black/African American. The NSBE chapter at USD is one of three undergraduate-focused Black organizations campus wide. The chapter was founded in 2016 and started with seven members; now, membership ebbs and flows between 20–25 students. Members primarily include students working toward an engineering degree, but some earn degrees in physics, computer science, and architecture. General executive board leadership positions (i.e., president, vice president, secretary, academic chair, senator) are primarily filled by students who started as members in their 1st year and chose to run for an officer position starting their 2nd year. The organization prioritizes community-building events, study “jams,” and industry-specific workshops. Their annual focus is to raise funds to provide travel scholarships for their chapter members to attend the annual national convention. These activities have been created to stimulate engagement in NSBE, contribute to student development of an interest in engineering, encourage members to seek advanced degrees and

professional registrations, establish mentoring relationships for Blacks in engineering, and function as a representative body on issues that affect Black engineers (Daily et al., 2007).

Engineering undergraduate programs continue to make efforts to improve the recruitment and retention of underrepresented minority students; yet, the historical underrepresentation of racial and ethnic minority groups in engineering persists (Martin et al., 2013; Ovink & Veazey, 2011; Samuelson & Litzler, 2016). Samuelson and Litzler (2016) asserted, to understand factors that support historically underrepresented student persistence, it is crucial to examine what works specifically for different groups of students. Rather than highlight the challenges that persist with Black students pursuing engineering degrees, a more critical approach to understanding their lived experience is needed to truly address the issue of underrepresentation in engineering education.

An emerging approach to understanding the factors contributing to persistence and retention in engineering, particularly at PWIs, is to take an asset-based, antideficit approach to study Black student success. One theoretical framework that emphasizes the resource-rich narratives of students and communities of color is Yosso's (2005) community cultural wealth (CCW). CCW counters the deficit perspective often associated with educational research on students of color. This study went beyond the traditional measurements of student success to apply a cultural lens to the success of Black students pursuing engineering. Using CCW as a framework, this study highlighted the personal qualities, tools, and cultural capital students have used to overcome racial stereotypes, systemic barriers, and multiple forms of oppression often present in U.S. higher education systems.

Theoretical Frameworks

Deficit-centered research does its job in highlighting the challenges Black students pursuing engineering face in education; however, solely focusing on the hurdles students have to overcome does little in providing solutions for the systemic problems often left unaddressed. A limited perspective on which cultural resources have value to students can contribute to deficit-oriented approaches to supporting students of color, whereby students, rather than the institutions, are seen as needing to be fixed (Samuelson & Litzler, 2016). The constructs from the literature that informed this study were social capital, cultural capital, CCW, and the antideficit academic achievement model. This study aimed to illuminate aspects of wealth, capital, and community in engineering programs that have not been widely recognized or acknowledged in education.

Social and Cultural Capital

Bourdieu (1984) and Coleman (1990) are the founding theorists of social capital. *Capital* is accumulated labor existing in the material or incorporated world and can grow when it has the ability to be reproduced (Häuberer, 2011). Bourdieu believed people from different social positions differ from one another about their possession of three forms of capital: social, cultural, and economic capital. *Social capital* refers to individuals' relationships with others to use for their success (Adler & Kwon, 2002; Ferguson, 2016). Relationships create honor and reputation among members in a group and provide safety and status credit for each other (Häuberer, 2011). Benefits from these investments can only be gained if the individual understands the group and learns how to use them or rework them into cultural or economic capital (e.g., a student who needs to know whom to ask for assistance with getting their dream internship). Coleman (1990) believed social capital is a mode of social structure that eases the activity of an individual in a

structured context. Whether or not a social structure is also a form of social capital depends on whether its function serves the individual involved in a particular action (Rogošić & Baranović, 2016).

Within critical theory, education is situated as the gatekeeper of cultural capital and power because classrooms perpetuate what counts as valuable knowledge, behaviors, and skills in society (Denton et al., 2020). Disparities in the amount of cultural and economic capital, which often come hand in hand, can set students apart at a young age. In higher education, economic and cultural capital are often highlighted through material objects such as access to a car, residential hall furniture, and unlimited access to food at the dining hall, which signal the amount of capital possessed by students. Due to capital accumulation, parents rich in cultural capital know to invest in education (e.g., sending their children to preschool and paying for college). Those lacking in cultural capital do not have the awareness or necessity of early learning and many do not have the economic capital to finance their child's education (Häuberer, 2011). Education can limit access to conventional sources of capital by perpetuating a traditional view of what counts as capital (Denton et al., 2020).

There are clear strengths in understanding the value of accruing capital. A distinction with both social and cultural capital is that these types are typically not consumed in their use. The "spending" of social and cultural capital only increases their accumulation and value (Bourdieu, 1986). What is not considered within these theories is the undeniable impact of systemic racism on the Black community and its relationship to the activation and accrual of all forms of capital. Black communities are often conditioned to believe they are already at a disadvantage compared to White communities, directly aligning with a deficit mindset. This

limitation can potentially affirm the notion that the underachievement of low-income students of color can be attributed to a lack of social and cultural capital.

CCW

CCW offers an alternative approach to cultural capital and helped identify how Black engineering students have used their values and cultural backgrounds as tools for success in college. Communities of color are often depicted as culturally deprived, whereas White upper- and middle-class culture is legitimized as the gold standard (Jayakumar et al., 2013). Yosso's (2005) CCW theoretical framework extends Bourdieu's (1984) capital framework by providing a broader perspective on how different cultural attributes can serve as resources for students of color as they navigate institutions of higher education (Samuelson & Litzler, 2016). The quantity of research on the perceived deficits of students of color and their broader cultural communities prompted the development of Yosso's theory of cultural wealth (Burt & Johnson, 2018). Yosso's theory critiques previous conceptualizations of social and cultural capital based on White, middle-class ideologies and advances considerations of additional forms of capital found in communities of color that promote success (Burt & Johnson, 2018; George Mwangi, 2015; Harper, 2010; Rendón et al., 2014). Grounded in critical race theory, CCW is an asset-based framework that highlights six cultural resources (i.e., aspirational, navigational, social, familial, linguistic, and resistant capital) that communities of color draw on to succeed in educational environments not designed for them (Zepherin & Jesiek, 2018). CCW is explained in further detail in the following chapter.

Antideficit Achievement Framework

In a study conducted by Harper (2010), which used data from the National Black Male College Achievement Study (NBMCAS), 219 Black male undergraduate students who identified

as student leaders on their respective campuses were interviewed regarding their success in college. All students had above a 3.0 grade point average, established examples of leadership, developed meaningful relationships with administrators and faculty outside of the classroom, and engaged in multiple student organizations. The results of Harper's (2010) study showed how Black male student achievers managed to gain admission to their institutions, overcame adversity that typically disadvantaged their peers, and accrued experiences that made them competitive for internships, jobs, and access to highly selective graduate and professional schools. This study was an example of a researcher who focused on understanding how these students acquired various forms of social and cultural capital versus centering inquiry on what students lacked.

An additional result of Harper's (2010) study was the development of an antideficit achievement framework that was customized for the study of students of color in STEM. At the center of this framework is the importance of peers and faculty to the persistence of student achievement in STEM. Harper's (2010) antideficit achievement framework was adapted from the NBMCAS as a lens through which to explore what enables student achievement in STEM. The framework inverts questions commonly asked about educational disadvantage, underrepresentation, insufficient preparation, and academic underperformance, and offers a frame for antideficit inquiry (Harper, 2013). Questions are provided for consideration in three pipeline points (i.e., precollege socialization and readiness, college achievement, and postcollege success) as well as eight researchable dimensions of achievement (Harper, 2013) as displayed in Figure 1.

Figure 1*Antideficit Achievement Model*

Pre-College Socialization and Readiness	College Achievement		Post-College Persistence in STEM
<p>FAMILIAL FACTORS</p> <p>How did parents help shape one's college and STEM career aspirations?</p> <p>What did parents do to nurture and sustain one's math and science interests?</p> <hr/> <p>K-12 SCHOOL FORCES</p> <p>What was it about certain K-12 teachers that inspired math/science achievement?</p> <p>How did one negotiate STEM achievement alongside popularity in school?</p> <hr/> <p>OUT-OF-SCHOOL COLLEGE PREP EXPERIENCES</p> <p>Which out-of-school activities contributed to the development of one's science identity?</p> <p>Which programs and experiences enhanced one's college readiness for math and science interests?</p>	<p>CLASSROOM INTERACTIONS</p> <p>How did one negotiate "onlyness" and underrepresentation in math and science courses?</p> <p>What compelled one to persist in STEM despite academic challenge and previous educational disadvantage?</p> <p>OUT-OF-CLASS ENGAGEMENT</p> <p>What compelled one to take advantage of campus resources, clubs, and student organizations?</p> <p>What value did leadership and out-of-class engagement add to one's preparation for STEM careers?</p> <p>Which peer relationships and interactions were deemed most valuable to STEM achievement?</p>	<p>Which pedagogical practices best engaged one in math and science courses?</p> <p>How did one craft productive responses to racist stereotypes in the classroom?</p> <p>EXPERIENTIAL/EXTERNAL OPPORTUNITIES</p> <p>How did one go about securing a STEM-related summer research experience?</p> <p>In what ways did research opportunities, conference attendance and presentations, and so on help one acquire social capital and access to exclusive, information-rich professional networks?</p>	<p>INDUSTRY CAREERS</p> <p>Which college experiences enabled one to compete successfully for careers in STEM?</p> <p>Which college experiences best prepared one for racial realities in STEM workplace environments?</p> <hr/> <p>GRADUATE SCHOOL ENROLLMENT</p> <p>What did faculty and institutional agents do to encourage one's post-undergraduate aspirations?</p> <p>Who was most helpful in the graduate school search, application, and choice processes?</p> <hr/> <p>RESEARCH CAREERS</p> <p>What happened in college to ignite or sustain one's intellectual interest in STEM-related topics?</p> <p>From which college agent(s) did one derive inspiration to pursue a career in STEM-related research?</p>

Harper's (2010) approach attempted to illuminate how ethnic minority students, particularly those from lower-socioeconomic upbringings, cultivate meaningful and value-added relationships that could influence their postgraduation success. This framework was referenced as the interview questions and protocol for this study were developed and solidified.

Purpose of the Study and Research Questions

Many within the higher education system have not fully considered how higher education privileges White male students, for which the institution was established, while marginalizing others (Bensimon, 2005; Denton et al., 2020; Harper, 2010). Supporting diversity in engineering is imperative for higher education institutions and the benefit of the country. The purpose of this study was to explore the cultural capital that Black students rely on as they persist at USD. Through this study, I also sought to identify what capital, if any, is fostered through

involvement in the NSBE. Despite evidence of ethnic student organizations' salience in undergraduate students' experience pursuing an engineering degree, much remains to be learned about the role that culturally focused professional organizations play in a student's ability to use and grow their cultural capital as they persist in as an undergraduate student. Additionally, previous research has yet to focus on African Americans' experiences in academic-based, culturally focused student organizations, which differ from other minority students. The following research questions guided this study:

1. How has Yosso's (2005) community cultural wealth (CCW) theoretical framework been used by Black students involved in the NSBE chapter as they persist at USD?
2. In what ways, if any, does participation in NSBE increase or enhance CCW for Black students at USD?

Significance of the Study

Tinto (1993) believed Black students face unique challenges to academic and social integration into PWIs because their norms and values may be incongruent with those of the White majority (Guiffrida, 2006). Much research has focused on retention challenges and the lack of preparedness for students entering the engineering discipline. There has been less research conducted on the social and cultural attributes that lead to educational success. Though underrepresented at their institution, Black students who choose engineering as an academic pathway at USD have a significant wealth of knowledge, which deserved to be explored. Similar to Mejia et al. (2018), my goal was to use an antideficit approach to offer the participants an opportunity to experience liberation from oppressive forces, thereby allowing their experiences to serve as a tool to promote freedom. The findings can enable higher education stakeholders to enhance their understanding and support of Black undergraduate engineers. Additionally, using

CCW provided a lens to understand better these types of extensive strengths that Black engineering students possess, versus solely identifying skills they lack. This research contributes to scholarship that is asset-based and focused on acknowledging Black people's contributions in higher education and the field of engineering.

CHAPTER 2

LITERATURE REVIEW

Black Undergraduates at Predominantly White Institutions

Higher education has long been viewed as a vessel for intellectual engagement and upward mobility in U.S. society. Despite this trajectory, low graduation rates and lack of access to the socioeconomic advantages of degree attainment remain a contemporary issue for Black students at predominantly White institutions (PWIs). Historically, Black students have been excluded from PWIs longer than they have been welcomed to attend and matriculate (Harper et al., 2009). Less than a century ago, Black students were not allowed to learn in the same classrooms, live in the same student housing, or eat in the same dining halls as their White peers. The civil rights movement in the 1960s made a widespread effort to address many of the wrongs imposed on Blacks for centuries, which included increasing access to higher education (Allen, 1992). This effort dramatically increased the enrollment of Black students at colleges and universities across the country. Though greater access to college was a victory for racial equality, this effort did not ensure that campuses were welcoming or made efforts to include all those enrolled.

To level the playing field, academic institutions developed policies to increase access and mitigate discriminatory practices, including the Supreme Court's ruling on affirmative action. Under the Civil Rights Act of 1964, President Lyndon Johnson's administration initiated affirmative action to improve Blacks' opportunities (Britannica, n.d.). Affirmative action means an individual's race, sex, religion, or national origin can be considered when decisions regarding college admission are being made. Preference to admission is typically given to underrepresented identities or those who have been historically discriminated against, with less attention paid to

test scores and grade point averages (Britannica, n.d.). Some higher education researchers could argue that this is progress in the right direction; however, there is no denying that these efforts have been undermined by several issues, including (a) continued underrepresentation of Blacks at PWIs, (b) racially biased college entrance exams, (c) consistent attempts to dismantle affirmative action, (d) increased admission standards without corresponding advances in the K–12 system, (e) reports of racism and negative student experiences, and (f) the decline of need-based financial aid (Harper et al., 2009). White stakeholders (e.g., students, faculty, alumni, administration) have established cultural norms that have governed higher education in the United States since its inception (Harper, 2009). Systemically, these long standing educational norms a considerable undertaking for higher education practitioners and administrators to remedy and an even more significant burden for Black students to tackle.

Tinto (1987) asserted that college students who perceive their norms, values, and ideas as congruent with those at the institution's center are more likely to academically and socially integrate into college. Most studies on Black undergraduates at PWIs have provided one-sided research focused on deficits and negative forces about integration into a traditional collegiate experience instead of enablers to success in college (Harper, 2013). Many Black students can have similar experiences on college campuses regardless of the institution, but it is important to note that Blacks are not one monolithic group. Nuances regarding what minoritized undergraduates do to positively impact learning, developmental change, and persistence among their same-race peers and other students of color have been lacking in the literature (Harper, 2013). With extreme underrepresentation comes a set of experiences that undermine institutional commitments to foster an inclusive environment (Harper, 2013). Several within-group variations of undergraduate students deserve to be examined, including Black students who have

personally, academically, and professionally achieved college success. Institutional subcultures are created and perpetuated by various groups on college campuses, including students with similar racial and ethnic backgrounds, students who share an academic major, students of a particular religious faith, or members of a formal student organization (Museus, 2008).

Unique Challenges of Black Engineering Students

Though Black students are of a minoritized race in higher education and can share experiences with other races, their experiences are unique with their distinctive challenges. Underrepresented students in predominantly White engineering programs generally have different ethnic and cultural values and socialization than their peers. They may internalize negative stereotypes, experience self-isolation and inadequate program support, and perceive racism from students, staff, and faculty (Brown et al., 2005; Samuelson & Litzler, 2016; Seymour & Hewitt, 1997; Tate & Linn, 2005; Walton & Cohen, 2007). When stigmatized individuals experience environmental cues that signal a lack of belonging, this experience may elicit a phenomenon called stereotype threat (Oliver et al., 2017; Shapiro, 2011). McGee and Martin (2011) defined *stereotype threat*, regarding Black undergraduate students, as a type of confirmation bias in which the threat of being viewed through the lens of a negative stereotype or the fear of doing something that would inadvertently confirm that stereotype suppresses academic performance among Black students at all educational levels.

Familial and Community Influence

A common proverb in the Black community is that “it takes a village to raise a child” which indicates the depth of social and community capital (Palmer & Gasman, 2008). The Black community is a source of cultural wealth and capital that can facilitate Black students college-going processes, but the “outsider” status that Black students often experience in schools is

further complicated by the lack of recognition of community wealth within the Black community (Jayakumar et al., 2013). Often, Black children tackle the complexity of navigating both a cultural and academic world. Many students of color have reported strong feelings of obligation to serve and repay their communities for the support they received (Samuelson & Litzler, 2016). Among all ethnic groups, Blacks are the only group to culturally encourage and promote self-reliance (Seymour & Hewitt, 1997), in part because they become more responsible at an earlier age—often helping with childcare, assisting in elderly care, and having a part-time job to support their family (White et al., 2006).

Flowers (2015) studied the impact of family on Black male undergraduate students at two highly selective universities. Flowers's study affirmed the combination of high parental expectations, firmness, encouragement, support, and continuous follow up was most valuable in aiding Black males in finding their way through various levels of the educational pipeline. Russell and Atwater (2005) also noted that Black student involvement in engineering and science enrichment programs supported by parents could encourage and motivate students to pursue a STEM degree upon entrance into college. One really cannot understand and appreciate a Black student's family if one has no context or understanding of how systems of oppression (including institutionalized racism) have significantly impacted racial, economic, sociocultural, and educational opportunities and disparities in the United States (Douglas et al., 2016).

Black Male Stereotypes

In the United States, the educational experiences of Black males can center around academic disparities, inequality of opportunity, and underpreparedness in career planning. Several researchers believed that focusing on student academic achievement, instead of having a deficit lens, is a more powerful way to explore the Black male collegiate experience (Harper,

2010; McGee & Martin, 2011; Sanders, 2019). Black students who join college with a clear goal to graduate with a degree tend to look at their athletic ability as a means to earn a scholarship to get an education (Simiyu, 2012). A STEM attrition study conducted by the National Center for Science and Engineering Statistics (2013) found that 36% of Black students who pursue STEM in college switch to non-STEM majors, and 29% leave postsecondary education without a degree. The National Center for Science and Engineering Statistics (2013) reported that only about 14% of Black male students intended to major in engineering. Black male students constituted just 4% of the engineering student population. Black male students have remained the most underrepresented in the STEM pipeline and workforce (National Center for Science and Engineering Statistics, 2013).

Gender stereotypes can easily shape how young Black children view themselves and their future abilities as engineers. For many young Black males, a sports fixation can discourage academic achievement in favor of physical self-expression (Hoberman, 1997). Interests beyond football and active outdoor play for young boys are often seen as abnormal and unacceptable by peers (Harper, 2004; Harris, 1994). Harper (2004) asserted that rarely, if ever, is the class president or smartest student in the class considered the most “manly” by his peers—unless, of course, he also participates in sports. Associating academic achievement with being a “nerd” and athletic ability with being “cool” can deter young Black boys from putting effort into their schoolwork at a young age (Harper, 2004). Unlike sports, which is often introduced in adolescence, much of society is unsure of what scientists and engineers do. The media produces images of scientists and engineers (primarily White) as unusually intelligent, socially inept, and absentminded. News media has added to this distorted image with stories that often emphasize scientists and engineers as otherworldly geniuses working in isolation (May & Chubin, 2003).

Engineering can be a completely foreign discipline for Black male students who make it to college. Supplemental classroom and summer camp experiences that promote engineering play a pivotal role in many students', particularly those raised with parents who do not have a college degree and are from low-income communities, lives during middle and high school years (Crown, 2012).

Prove Them Wrong Syndrome

Students who learn how to navigate their educational environments successfully do not equate to them feeling entirely comfortable. Though challenges come with being Black in higher education, many students pursuing an engineering degree find a way to overcome them. A seminal study conducted by Moore et al. (2003) used grounded theory to explore the perceptions, attitudes, and experiences of Black males able to persist in engineering at PWIs. Forty-two Black male students were interviewed, and the most significant theme that emerged from the data was something the researchers called the "prove-them-wrong" syndrome. This psychological phenomenon arises when the larger society projects an image of Black intellectual inferiority. These negative stereotypes turn to fuel for a student to achieve. One of the respondents shared:

Basically, you're working twice as hard not only to overcome what they [White engineering professors, students, and administrators] think of you but to eventually rise to what you know you can do. . .work twice as hard, proving someone wrong as opposed to proving someone right. (Moore et al., 2003, p. 67)

Another respondent stated:

A lot of times, when I am in study groups or in the classroom, I feel like I have to prove myself to my White peers and professors. It may be based on the fact that I can't draw from experiences on how I am supposed to act in the college environment. I can't really

call my mom and say, “How do I ask this question?” It’s sort of a behavior that some people have been able to model. When I say some people, I mean what White people have been able to model throughout history. (Moore et al., 2003, p. 67)

Aligning with the research, participants understood the stereotypes their White peers, advisors, and faculty held regarding their perceived ability to achieve academically. Regularly presenting a false persona can be exhausting and only add to uncertainty around academic pursuits and the ability to persist (Moore et al., 2003). This study contributed to the research on the internalized stereotype threat that Black students have to overcome to achieve substantial academic success.

McGee and Martin (2011) conducted a study that interviewed 23 Black academically successful mathematics and engineering students from four Midwestern universities. To secure participants, they targeted organizations such as the National Society of Black Engineers (NSBE) and the Black Student Union. It was concluded that students in the study equated their high academic performance and persistence, at least in part, as a response to the negative cultural views of Black people. Once students realized their achievements were perceived negatively from a young age, they started to build various strategies to lessen the threat and impact of stereotypes that they titled stereotype management. Although existing literature has highlighted the social and structural inequalities Black students face—particularly in engineering—it has offered little to understand the Black community’s potential contributions to PWIs through cultural capital.

Community Cultural Wealth

For Black students at PWIs, the individualistic and weed-out culture of engineering, ethnic isolation, and lack of interaction with faculty and the broader university community can leave students feeling isolated (Tolbert & Cardella, 2016). *Aspirational capital* is the ability to

remain hopeful and dream of the future regardless of the obstacles before a person (Yosso, 2005). Students who are high in aspirational capital have developed methods of resiliency and coping strategies to meet the high expectations they have set for themselves. Familial capital can influence aspirational capital by providing students with a grounding and basis to succeed through cultural and family knowledge (Yosso, 2005). This form of capital acknowledges one's community history and commitment to cultural intuition. For Black-identified college students, this familial capital can be created and nurtured through involvement in cultural student organizations. NSBE (n.d.) has often used the term "family" in much of their marketing and outreach to their members, signifying that this organization provides family and cultural support for their community.

Navigational capital highlights students' ability to navigate and maneuver social institutions, such as institutions of higher education (Yosso, 2005). This form of capital encourages students to push past hostile environments created from being an ethnic minority in a White majority space. In the context of this study, navigational capital focused on how cultural organization affiliation helped make sense of belonging, which is needed to navigate a PWI and an academic program where Black students are severely underrepresented. Resistant capital calls attention to the knowledge and skills fostered through oppositional behavior that challenges the issue of inequality (Yosso, 2005). This study was conducted when USD was engaged in a critical conversation about creating a more welcoming environment for Black students, faculty, and staff. Using a counterstorytelling methodology for this study, this form of capital offered student participants an opportunity to examine their current institutional climate, name inequalities they experienced, and address how they have overcome issues when they have arose. For underrepresented students through Yosso's (2005) theory, social capital addresses the networks

and community resources that students use to maneuver through colleges and universities. This form of capital for engineering students accrue through various avenues, including strong relationships with faculty and other mentors, connections with diverse peer groups both engineering and nonengineering, and securing research or an internship within their field. The social capital accrued through involvement in NSBE was a central data point within this source of capital.

Linguistic capital highlights the intellectual and social skills attained through communication experiences in more than one language or style (Yosso, 2005). For Black students, communication could be a head nod to say “what up!,” a fist bump as a congratulatory recognition, and an enthusiastic “HEY THERE GIRL!” for a friend who has not been seen in a while. This form of communication can contrast traditional forms of communication and professionalism, which often center on White norms. Black students at PWIs have reported that they usually *code switch*—adjusting their style of speech, appearance, behavior, and expression in ways that will optimize the comfort of others in exchange for fair treatment, quality service, and employment opportunities (McCluney et al., 2019). Music, poetry, and literature are also significant to the ways communities of color pass along information. Multiple forms of communication were seen as a gift and not a barrier to success within this study.

Typically used by education scholars, Martin and Newton (2016) used community cultural wealth (CCW) to study former engineering undergraduate students who were underrepresented or socially marginalized during their time in college. Their study focused on the participants’ testimonies of earned and unearned advantages in their lives and how advantages have impacted their engineering education. Martin and Newton’s goal was to unearth the unseen dimensions of their experiences versus making assumptions about their reality.

Similarly, Samuelson and Litzler (2016) used CCW as a framework to understand persistence for students of color in engineering. They learned that navigational and aspirational capital were alluded to the most by students, although all six forms were expressed and activated at different times by student participants in their study. Based on both studies, it is essential to note that the types of capital are dynamic in how they interact with one another and highlight the value of asset-based, qualitative research (Samuelson & Litzler, 2016).

Knaphus-Soran et al. (2021) believed the current cultural capital scholarship has overlooked the relational aspects of cultural capital espoused by Bourdieu (1986). This research team explored the relationship between the individual asset-based CCW framework and counter spaces where students are offered an opportunity to build the social and cultural capital of importance for institutions of higher education. One critical function of counter spaces is that they provide marginalized individuals opportunities to think, feel, and act in ways consonant with their own identities but typically devalued by the larger society (Case & Hunter, 2012). Knaphus-Soran et al. (2021) suggested that by identifying areas of misalignment between student assets and institutional values reflected in policies, the racialized nature of colleges and universities can be illustrated—shifting the focus toward institutional forces that sustain inequities.

Value of Counter Spaces in Higher Education

Research has suggested that when Black college students in PWI environments experience racial microaggressions (e.g., low faculty expectations, racial profiling from campus police, difficulty securing campus funding for cultural events, feeling stares from peers for being a different skin tone than others), they can feel academically and socially alienated (Carter, 2007; Harper, 2009). As a defense mechanism, Black students at a PWI have often created their

own counter spaces (McGee & Martin, 2011). Many underrepresented students seek out environments where their marginalized identity can be accepted and valued which, in turn, can present an alternative narrative to institutional assumptions and stereotypes regarding their identity. Case and Hunter (2012) looked at the link between counter spaces and the psychological well-being of marginalized groups. They developed a framework with three processes: (a) narrative identity work, (b) acts of resistance, and (c) direct relational transactions. As a result of their study, they proposed a conceptual framework that affirms the existence of counter spaces as radical sites of well-being promotion in the face of oppression and demonstrates that even amid oppressive societal conditions, mini ecological revolutions exist to provide marginalized individuals security, solidarity, hope, respite, and healing.

Harper and Quaye (2007) sought to explore the experiences of high achieving Black male student leaders at PWI's. Taking a phenomenological approach to capture participants "lived experiences" the questions centered around the participants' selection of student organizations, the impetus for their active involvement in out-of-class activities, and the experiences that influenced the development and expression of their racial identities. 32 participants from varying academic years participated in the study, none of whom were student-athletes. Harper found that student organizations afforded the participants opportunities to develop valued cross-cultural communication skills, enabled them to learn from others who were racially different, and fostered among them care and advocacy for other disadvantaged populations. Although some held membership in mainstream campus organizations, the participants' leadership and engagement were overwhelmingly situated in predominantly Black and minority student organizations with an expressed goal of uplifting their community.

Solórzano and Yosso (2000) used critical race theory to show how Black students experience racial microaggressions in academic and social spaces. Microaggressions are the subtle insults (verbal or nonverbal) directed toward people of color automatically or unconsciously. A significant data point in the study was the value of counter spaces as a response to racial microaggressions. Counter spaces offered a space for their participants to share their frustrations and get to know peers who also share in the experience of microaggressions and discrimination on campus outside of the classroom. Separating themselves from racially uncomfortable situations through the use of counter spaces confirmed to the researchers that creating such spaces is an important strategy for Black student academic and social survival at PWIs. Creating and using same-race peer networks and spaces within an educational environment to ignite one's construction of Blackness allows some Black students to cope with the negativity and discomfort they might experience in predominately White settings (Carter, 2007).

Peer-to-peer communities are essential for Black student retention, but there are still complexities with own race affiliations. Ogbu (2004) stated that Black students usually support their same-race peers when they earn good grades; however, embracing perceivably "White" ways of acting can cause high-achieving Black students to feel ostracized and left out of their community. This social ostracism, exclusion from Black activities inside and outside of school, labeling, and even physical assault were among the challenges with which academic achievers must contend (Harper, 2006). Similarly, White (1998) described the pressures often placed on Black students by their same-race peers to participate in Black student organizations; some participants this study joined these organizations merely to keep their Black identities unquestioned (Harper, 2006). A reason for this action could be that internalized oppression

compels Blacks to criticize, attack, or have unrealistic expectations of those who willingly step forward to assume leadership responsibilities (Harper, 2006; Lipsky, 1987). This potential discouragement could cause academically high-achieving Black students to seek identity-based organizations that align with their respective academic disciplines. Within engineering, this support can be found in culturally focused professional societies.

Thomas et al. (2021) sought to gain a comprehensive understanding of how Black engineering students used counter spaces and the associated values that can be attributed to involvement. The study stemmed from a more extensive National Science Foundation study that looked at the role professional organizations played in the success of Black engineering students. A well-known counter space for Black engineering students is the NSBE, which centered the participant recruitment for this study. Sixty students engaged in semi structured, one-on-one interviews and discussed how perceived facets of their identity and engagement with specific organizations impacted their collegiate experience. They concluded that professional and identity-related counter spaces straddle multiple classifications, affording students many potential benefits through engagement in one entity.

Student affiliations with academic and social organizations (e.g., NSBE) can be a protective support system for students. Many of these organizations were formed during the civil rights era due to civil and social injustices. Activism and political culture propelled the need for students in higher education to identify with a group with which they could express their concerns and interests (Simpson, 2019). From an engineering student perspective, engineering professional societies, honor societies, and clubs play an essential role in enhancing student experiences (Durham & Marshall, 2012). Historically, Black students attending PWIs often engage little in nonculturally specific organizations, leaving them by choice or forced to

participate primarily in race-specific organizations (Cooper, 2016; Fleming et al., 2013; McCurtis, 2012). Identity-based engineering student-led organizations can provide a landscape for connection and career support at little to no cost to an engineering school. Involvement in minority engineering student organizations is encouraged as a necessary extracurricular experience for students from underrepresented groups (Dickerson & Zephirin, 2017). A study on student retention in engineering conducted by Litzler and Samuelson (2013) concluded that students of color reported their affiliation with national societies and student chapters (e.g., NSBE and the Society of Hispanic Professional Engineers) are powerful tools for finding a sense of belonging on campus.

Professional Engineering Society Affiliation

One concern with all-minority organizations is that students could, through defining their community of peers, isolate themselves from the larger campus community. Seeing as engineering—both in academia and industry—is not made up of predominantly minority groups, the ability to work in these contexts is vital if minority engineers are going to be successful postgraduation (Daily et al., 2007). Professional engineering societies demonstrate this sense of social responsibility, of acting for the benefit of civilization at large, by providing continuing educational opportunities to their members, setting and maintaining professional standards, helping to clarify the knowledge and skill base needed by those practicing in the field, and serving as a bridge between employers and schools of engineering (Linder, 1966; Williams, 2017).

Organizations such as the Institute of Electrical and Electronics Engineers, American Society of Mechanical Engineers, Institute of Industrial and Systems Engineers, and several others assist students in preparing for entry-level positions upon graduation. They encourage and

promote leadership roles, study groups, networking with young professionals and industry, and participation in community service and competition projects (Durham & Marshall, 2012).

Another benefit of membership is that these are student-run chapters of national or regionally run industry professional groups. Affiliation with student chapters of professional engineering societies often results in students having the opportunity to network with leaders within their field of choice at conferences and networking events. Typically, these organizations commit to growing the workforce in their field through the college-to-career pipeline. Many groups offer academic scholarships, conference travel scholarships, and inroads into employment opportunities based on their interest and participation in the student-run professional society chapter (Daily et al., 2007)

The National Academy of Engineering (Williams, 2017) reviewed 124 professional engineering society websites to identify the direct and indirect engagement between societies and students based on the evidence available on their public webpages. Their review found that affinity societies directly and indirectly engage and influence engineering education. Affinity engineering societies support diversity, equity, and inclusion in engineering by fostering an inclusive environment where members discuss their engineering career experiences (Society of Women Engineers, n.d.). Of the 124 societies assessed, 14 were classified as affinity engineering societies. Seven of the affinity groups have student chapters, including the Society of Women Engineers, the American Indian Science & Engineering Society, the NSBE, and the Society of Hispanic Professional Engineers. Though these groups are not aligned with a specific discipline, they prioritize the unique needs of minority populations in engineering and tailor initiatives to serve those communities.

Summary

Black students make up less than 7% of the undergraduate engineering population, and less than 4% make it to graduation (National Center for Science and Engineering Statistics, 2016). The national, regional, and institutional data regarding the low levels of persistence and graduation rates of Black students are tethered to their identity as they navigate their collegiate experience at a PWI. Black students cannot “not” be Black on their college campus, and there are an array of stereotypes that follow them no matter how hard they work in and out of class. Though quantitative data on enrollment and graduation statistics indeed tell a story, the data do not capture the whole narrative behind how students persist and do so successfully. NSBE (n.d.) chapters, with university and national organization support, design interventions for increasing the number of Black engineers through promoting degree progress, academic achievement, and professional development for its members.

CHAPTER 3

RESEARCH METHODOLOGY & DESIGN

This study used Yosso's (2005) community cultural wealth (CCW) theoretical framework as a tool to illuminate the resource-rich experiences and community offerings of Black students involved in the National Society of Black Engineers (NSBE) at the University of San Diego (USD). This study also highlights how student participants access, activate, and foster cultural wealth as they navigate a predominately White institution (PWI). CCW is a part of the collective set of critical race theories that rely on intersectionality, a critique of liberalism, the use of critical social science, a combination of structural and poststructural analysis, the denial of neutrality in scholarship, and the incorporation of storytelling—or, more precisely, “counternarratives” (Denzin & Lincoln, 2018, p. 381) to speak against dominant discourses. Solórzano and Yosso (2002) expanded on critical race theory to define a critical race methodology as a theoretically grounded approach to research that (a) foregrounds race and racism in all aspects of the research process; (b) challenges the traditional research paradigms, texts, and theories used to explain the experiences of students of color; (c) offers a liberatory or transformative solution to racial, gender, and class subordination; and (d) focuses on the racialized, gendered, and classed experiences of students of color.

Solórzano and Yosso (2002) believed research and theoretical models that seek to explain inequities and achievement differences in education often support majoritarian viewpoints through the constant amplification of deficiency among students of color. Counterstorytelling is a tool that critical race theory scholars use to contradict racist characterizations of social life and expose race-neutral discourse to reveal how White privilege operates to reinforce and support unequal racial relations in society (Manglitz et al., 2006). Counterstories support social, political,

and cultural cohesion and survival and resistance among marginalized groups. CCW was positioned in this study to center this antideficit approach to the research and hold space for counternarrative inquiry through counterstorytelling. Storytelling was also selected as a narrative analytical approach because of the historical ways with which the Black community communicates and shares information.

Data Collection Procedures

Qualitative interview approaches have successfully elucidated students' experiences who pursue science, technology, engineering, and mathematics (STEM) and perspectives from underrepresented groups (Litzler & Samuelson, 2013). The purpose of using interviews as a data collection method was to give voice to the Black engineering student experience, which can often be forgotten, seeing as there are so few who choose this academic path. For this study, qualitative data collection consisted of open-ended interview questions. Brinkmann and Kvale (2015) outlined seven stages of interview inquiry, which I used as a step-by-step path explained within this chapter. The seven stages include (a) thematizing, (b) designing, (c) interviewing, (d) transcribing, (e) analyzing, (f) verifying, and (g) reporting.

Thematizing refers to formulating research questions and theoretical clarification of the theme (Brinkmann & Kvale, 2015). Based on the value storytelling has in understanding the experiences of communities of color, interview protocol and questions were created to align with the six forms of capital in Yosso's (2005) CCW framework. Though the CCW framework assisted in directing interview structure and protocol, I went beyond the bounds of theory. I allowed for free expression and an open forum for students to articulate the capital they said was valuable to their success at USD through their interpretation of the questions. The research questions that guided this study included:

1. How has Yosso's (2005) community cultural wealth (CCW) theoretical framework been used by Black students involved in the NSBE chapter as they persist at USD?
2. In what ways, if any, does participation in NSBE increase or enhance CCW for Black students at USD?

CCW helped identify individual student attributes, highlight critical aspects of NSBE's operations, and provide empirical insights into how NSBE chapters support their members (Zepherin & Jesiek, 2018). Harper's (2010) antideficit achievement framework was used as a guide while creating the interview protocol (see Appendix A) to ensure that questions were framed to capture student participants as resources-rich. This framing helped counter deficiency narratives that have been all too common with educationally based studies on Black undergraduate students.

Participant Selection and Interview Process

Designing the interview refers to the planning and techniques of the study (Brinkmann & Kvale, 2015). This stage started with participant selection process and procedure. This study focused on a single NSBE chapter at a university, which led me to choose convenience sampling as the most appropriate mode of soliciting participation. For inclusion in the study, participants met the following criteria: (a) enrolled at the USD within the 2020–2021 academic year, (b) active NSBE member through a NSBE national paid membership, and (c) identified as Black or from African descent. The cost of the national paid membership is offered to all active members and is covered by USD at no cost to the student.

Interviewing encourages interviewees to describe their points of view on their lives and their worlds (Brinkmann & Kvale, 2015). Participants were emailed 2 weeks before the data collection process to gauge preliminary interest in the study. All interested participants were

asked to fill out a consent-to-participate form as a part of the Institutional Review Board (IRB) procedures to join the study formally. This form was shared and received via the Google forms platform. I received interest and consent from 12 NSBE members. Individual student interviews were conducted on a one-on-one basis via the Zoom video conferencing platform and lasted between 60–75 minutes in length. Before starting the formal interview, an explanation of the study’s intentions, purpose, and general research questions were discussed, including a description of Yosso’s (2005) theoretical framework. The interviews were conversational, descriptive, and times, very humorous.

I started each interview with introductions which included: “Please share your name, gender, major, and year in school,” “What led you to choose your major?,” and “Tell me about when you first found out about NSBE?” Descriptive interview questions help the researcher secure an understanding of study participants’ routines and perspectives and elicit “opinions, experiences, feelings, and knowledge” (Patton, 2015, p. 4). Interviews were semistructured, allowing for individualized counternarrative inquiry based on student participant responses. Eliciting storytelling was a foundational component of this study. After the initial request for the story, Brinkmann and Kvale (2015) believed the central role of the interviewer is to remain a listener abstaining from interruptions, occasionally posing questions for clarification, and encouraging the interviewee to continue telling their story. After each question, I used the audio mute function on Zoom to not distract the interviewee.

A significant factor contributing to the interview framing and data analysis was that all student participants were engaged in remote learning due to the COVID-19 global pandemic. In March 2020, the COVID-19 global pandemic—a highly contagious, potentially fatal virus transmitted primarily through close human contact (Baggish et al., 2020)—forever changed

formal higher education practices. Due to health, safety, and location restrictions, all interviews were recorded using the Zoom video conferencing platform. Involvement in the NSBE chapter at this time was also done remotely. Additionally, analytical memos were taken throughout the entire data collection process and incorporated into the analysis process to ensure the study's trustworthiness.

Transcribing is an interpretive process that translates from oral discourse to narrative mode (Brinkmann & Kvale, 2015). Each interview was video and audio recorded via Zoom. The audio was then uploaded to an online transcription service that used artificial intelligence to transcribe the data. I then went through each transcription and corrected any misinterpretations or misspellings within the data. Replaying the interviews and listening with depth and detail was vital for identifying personality characteristics and themes in each student's story. Once the interviews were transcribed verbatim, I went through the transcripts again to illuminate some filler language, such as "um" and "like," to streamline the message in the transcribed data. At this point, I sent each student participant the raw transcription of the data for their review and allowed 2 weeks for them to edit, remove, add, or rewrite anything they felt did not best express their true thoughts, feelings, or emotions. Member checking is discussed in more depth later in this chapter.

Data Analysis Procedures

Analyzing allows the interviewer to decide what mode of analysis is most appropriate for their study (Brinkmann & Kvale, 2015). I developed a three-phased analysis process outlined in this section. Phase 1 used the priori or preexisting codes based on the six forms of capital defined in Yosso's (2005) CCW theoretical framework. For each interviewee, I pulled direct quotes from the interview transcription that fit into each source of capital. As I also used CCW to group

interview questions, this was a straightforward process. Similar to the overlapping of capital within the CCW framework, it became instantly clear that much of the interview data fell into multiple capital categories. Within each preexisting source of capital, I created consistent subcategories used as a framework for all categorizing in this phase. Phase 1 codes and subcategories are outlined in Table 1.

Table 1

Phase 1 Codes and Subcategories

Familial Capital	Aspirational Capital	Social Capital	Linguistic Capital	Navigational Capital	Resistance Capital
Parental Expectations Source of Support	Stereotypes of Black People	Black Peers	Code-Switching	NSBE Peer to Peer Support	Black Existence in College
Independent Decision Making	Family Motivation	Meaningful On-Campus Connection	Community Cultural Norms	Assumptions of USD	Black Privilege
Grandparent Influence	Peer to Peer Motivation	NSBE Connections	Music/Art/ Performance	Relationship to Larger Black Community at USD	Social Skill Building
Sibling Impact	NSBE Influence	External NSBE Involvement		Navigating Nonideal Situation at USD	
Friends as Family	Pandemic and Aspirations			Advice for new Black students	
Family Support/ Remote Learning	Internal Drive			Navigating Privileged Peer Environments	
	Distractions From Aspirations				
	Aspirations for the Future				

Once Phase 1 was finalized, I sent student participants individual categorized excerpts for review. I asked them to highlight anything with the color blue that they did not want to be shared in the findings of this study. Similar to their review of the raw transcription, they also had the freedom to edit, rewrite, and remove anything they wanted to change. During Phase 2, I searched for commonalities and themes among all student participant interviews. After reviewing each participant's categorized data from Phase 1, I developed a second coding document that broke down the subthemes identified during Phase 1 into more granular subthemes. I then added student participant data across all subthemes, which (a) provided a holistic view of all

participants relationship to cultural capital, (b) identified the sources of capital activated the most and least among this group, and (c) noted the variation of experiences that fell under each theme and subtheme.

Phase 3 addressed the data that fell beyond the bounds of Yosso's (2005) framework. Additional codes were defined through open coding. Overall, these additional codes honor the breadth and beauty of Black student stories and experiences, which was a goal of this study. *Verifying* ascertains the validity, reliability, and generalizability of the interview findings. Honoring their stories through their voices, what the participants wanted to share was important to me as a researcher who also had a personal relationship with all participants. Member checking was imperative to the validity of this study because it gave participants all control over the gift of their stories, which were so kindly offered to me as a researcher. The final member checking request for participants was a review of the brief participant descriptions to ensure they supported my approach to protecting their identity. Brinkmann and Kvale's (2015) final stage is reporting the data that communicates the study's findings. The findings are organized and outlined in detail in Chapter 4.

Role of the Researcher

It is essential to acknowledge my preexisting relationship with those who chose to participate in this study. Not only do I hold the role of advisor to the NSBE, I also direct career development in the engineering school at USD. As a Black, female administrator who has over 6 years of experience working at this institution, I would be remiss not to address the fact that I, too, am one of the few Black people within the engineering school and on campus as a whole. This experience could have influenced how they engaged with me as a researcher, how I heard their answers, and how I interpreted the data. It was vital for me to take note of my feelings,

facial expressions, and empathy throughout the one-on-one interview and focus group data collection process through analytical memoing. Though there was a direct connection between me and the participants, I viewed this connection as an asset. I incorporated multiple forms of data collection to ensure trustworthiness and transparency.

CHAPTER 4

FINDINGS

As discussed in previous chapters, this study used a counterstorytelling methodology and Yosso's (2005) community cultural wealth (CCW) theoretical framework to explore the cultural capital Black students rely on as they persist at a predominately White institution (PWI). This study also sought to identify what capital, if any, is fostered through involvement in the National Society of Black Engineers (NSBE). The research questions were as follows:

1. How has Yosso's (2005) community cultural wealth (CCW) theoretical framework been used by Black students involved in the NSBE chapter as they persist at USD?
2. In what ways, if any, does participation in NSBE increase or enhance CCW for Black students at USD?

Synthesis of Results

Findings in this section are organized into eight sections. The first section introduces student participants, including a brief biography and their relationship to the NSBE organization. Then, the sections are organized based on the six sources of community cultural capital as outlined by Yosso's (2005) theory: (a) familial, (b) aspirational, (c) social, (d) navigational, (e) linguistic, and (f) resistant. Data are shared in the form of direct quotes from student participants that reflect their voices and provide evidence of the various forms of capital students activate and rely on as they traverse multiple systems at a PWI. This section concludes with a review of additional findings that highlight other sources of capital systems that fall outside the bounds of the CCW framework. Short descriptions of CCW in a higher education context can be found in Table 2.

Table 2*CCW Summary*

Type of capital	Higher educational context
Familial	Students ability to access family and community support.
Aspirational	Students hopes and dreams beyond their current life circumstances.
Social	Students use of individual and community networks as a source of support and access to opportunity.
Navigational	Students ability to navigate institutional systems that were not built for them to succeed.
Linguistic	Students ability to access multiple modalities of communication to navigate college.
Resistant	Students oppositional behavior to adversity due to inequality.

Categories and themes emerged, intersected, and overlapped as student participants identified the sources of capital they access and use as they navigate college to pursue a degree.

Participant Profiles

Because all participants attended the same institution and were a part of the same organization during the same academic year, my priority was to protect their identity thoughtfully. I believe the richness of participant stories was illuminated through the data analysis. All participants chose pseudonyms and approved their short description, which is detailed next. Descriptions are written in the past tense to highlight their identity when the data were collected. Identifiers such as academic majors and the city they grew up in were omitted from the descriptions to maintain anonymity. All participants did have the opportunity to add any particular information I omitted, so the descriptions vary in information shared. The participants in this study are described and presented next in no specific order.

Akosua Johnson

Issa was a 2nd-year student pursuing a degree in engineering. She identifies as Ghanian American and was originally from the Pacific Northwest. Issa is a first-generation American and

the youngest of seven siblings who earned an undergraduate degree. She has been a member of NSBE since her 1st year in college and held a position on the executive board.

Marshawn Bench

Marshawn was a 4th-year student pursuing a degree in engineering. He identifies as Black and was originally from the East Coast. Marshawn attended an affluent private high school not located in the community where he grew up.

Kyrie James

Kyrie was a 4th-year student pursuing a degree in engineering. He identifies as Black and was originally from northern California. He grew up in a single-parent household and is a first-generation college student. Kyrie attended a private high school where he was a student athlete. Since his 2nd year, he has been on the NSBE executive board and held several leadership positions within the organization.

Chloe Sanders

Chloe was a 3rd-year student pursuing a degree in engineering. She identifies as Black and was from the state of Nevada. Chloe grew up in a two-parent household and has several family members who have earned college degrees. Since her 1st year in college, she has been a member of NSBE and held several leadership positions on the executive board.

Zay Jones

Zay was a 3rd-year student working toward a degree in computer science. Zay was originally from the Midwest and was raised in a two-parent household with her grandparents. Zay identifies as Black and held several leadership positions in multicultural organizations, including roles on the NSBE executive board. Zay was a member of NSBE since her 1st year in college.

Ashley Carter

Ashley was a 4th-year student pursuing a degree in engineering. She identifies as biracial and was a native of Southern California. Ashley grew up in a two-parent household and attended a private high school. Since her 1st year, she has been a member of NSBE and held several positions on the executive board.

Alton George

Alton was a 3rd-year student pursuing a degree in engineering. He was originally from North Carolina and grew up in a single-parent home. Alton identifies as Black and was raised in a predominantly Black community. He has been a member of NSBE since his 2nd year and held a role on the executive board.

Elijah Walker

Elijah was a 2nd-year transfer student pursuing a degree in engineering. He was from northern California and grew up in a single-parent home. Elijah attended a boarding school for high school.

Allison Foster

Allison was a 2nd-year student pursuing a degree in engineering. She was originally from Oklahoma and attended a selective public high school. Allison was a new member of NSBE and looked forward to running for an officer position at the time of this study.

Bill White

Bill was a 2nd-year student pursuing a degree in engineering. He was originally from northern California and was raised in a two-parent household. Bill graduated from a private high school where he was a student athlete. Since his 1st year, he has been involved in NSBE and looked forward to running for an executive board position.

Barry X

Barry was in his final year of pursuing a degree in engineering. He identifies as Black and was originally from northern California. Barry attended a public high school where he was a student athlete. He continued athletics in college. He has been a member of NSBE since his 4th year.

Lonnie Kingston

Lonnie was a 2nd-year student working toward degrees in both physics and mathematics. He identifies as Ghanaian American and was raised in a single-parent household. He has been a member of NSBE since his 1st year in college.

Familial Capital

Familial capital refers to the cultural knowledge and nurturing from family and community (Yosso, 2005). Familial capital appeared most for participants in the form of family guidance on the path to higher education. A common thread throughout the interviews was the student participants' ability to use the awareness of the sacrifices their family had made for them and turn that awareness into intention and a grounding for their drive toward degree completion. Through these kinship ties and commitments to community well-being, they internalized the importance of maintaining a positive and continued connection to their community (Yosso, 2005). This section highlights the top themes: (a) Parental Influence and (b) the Family Village that raised them.

Parental Influence

Parental influence and empowerment influenced all participants' educational choices and decisions at an early age. Chloe's academic drive started at an early age. Her parents set

expectations for her to simply do her best, and she expressed gratitude for all they have done to support her along the way. She stated:

They've always been very proud of me. I've been a good daughter; I believe I've been a great student. I've been getting like numerous awards ever since I was in elementary school. So they expect the best of me. And that's what I give them. They've done everything for me. I'm extremely grateful for everything they've given me and the life they've given me.

When discussing his upbringing in the South, Lonnie discussed his mother's choice to send him to the best schools in the area, even if it was not in the area he lived. He shared, "My mom wanted me to be in more like well-supported schools, and just by correlation, they also happen to be PWIs." Barry described his father's influence on his pursuit of engineering through enrolling him in preengineering programs, saying:

The reason I'm an engineer, too. My dad always told me, engineering is the way to go. As far as getting good skills and jobs. When I was little, I went to a summer camp at Cal Berkeley when I was in eighth grade, and I got exposed to some engineering concepts and stuff. My family kind of emphasized education and going to college and doing all this stuff when I was little.

Confidence in educational pursuits went beyond academics. Many students attended private high schools, which might have offered a more substantial commitment to academics but highlighted that they were one of the few, if not the only, Black students in their classes. Chloe discussed how her parents encouraged her to take pride and advantage of the value of being Black at a PWI. She said:

They even said like because you're Black, you might have an advantage because of the way the world is going, they value diversity more, and so you're more likely to get those scholarships where people want to hire you so that they can meet diversity quotas. So they taught me to use my blackness as more of an advantage and see it as an advantage rather than a disadvantage. So that definitely helps my outlook on life as far as being in the classroom being a minority, especially in engineering.

Watching a parent overcome adversity for the family was also identified as a source of motivation and strength. Elijah reflected on his upbringing and knew that he might not have had a lot, but he always knew his mother was doing her best. He shared, "My mom, she kind of always instilled in me growing up, like how that was just going to be the reality of things, you know. I think my family, my mom she did everything she could." Many people in Elijah's family are entrepreneurs, including his mother. Though there was a struggle, he pulled insight from her experience. He shared:

With the pandemic, I also realized that starting a business wasn't as hard as I thought. It is hard, but it wasn't as hard as I envisioned it to be. And I saw my mom do it. And I'm like, well, that's a resource right there. And I saw her struggle through it; just kind of having your own business and having an idea is not as hard as I thought.

Family Village

Yosso (2005) believed familial capital is nurtured by extended family, which could include immediate family (living or passed on) in addition to aunts, uncles, grandparents, and friends considered family. Extended family also played an important role in several participants' journeys. Role modeling and following siblings' path are important factors within familial

capital. When discussing his family structure, Lonnie identified the influence of his older sister, saying:

My sister was a computer science and mechanical engineering kind of geared person and was achieving really great things not just in one field but just all across the board. And, having her in my life and looking up to her was just really important to me.

He continued describing the influence his sister's ambition had on him, saying:

And it really made me, you know, it showed me that not even just someone who looks like me can do it, but someone in my family, my sister, was able to do it. And so, I felt like I could do anything. And I followed everything she did and tried to be just like her before eventually trying to, you know, become my own person.

Grandparents also played a significant role in several student participants' lives. Allison discussed how influential her grandparents were to her path to college. She said, "And they were heavily influential, my, my grandma and grandpa, they were all pushing, like you have to go to college, like, not going to college was not an option." Elijah discussed the encouragement he received from his grandparents and their influence on his unwavering commitment to persist, saying:

My grandfather and my grandmother used to make me write lines whenever I would say I can't do something. I had to get "I can't" out of my vocabulary, you know, so it was one of those types of things, they'd never really, let me say, I can't do something.

Individual and collective belongingness at PWIs can be susceptible to the often-unavoidable assumptions and stereotypes associated with Black students. Ashley's grandmother offered her a different perspective on being Black in a White educational space. She shared:

One thing that I got from my grandma that I learned, or she gave me for high school, is that if I wasn't there, then no one else would be. If I'm the only Black person in my classroom, rather than feeling it as a burden of like, there's no one else around me. Like, they all look to me for answers. Trying to look at it from a different perspective of, if I wasn't there, they're going to continue with whatever mindset whatever comments they want. If that means that they have to minimize the number of times that they say x, y, and z, because I'm here, that means that they're not using it as frequently as they would, right, they're not comfortable around me.

Ashley's grandmother's message illuminated the caring and coping mechanisms elders pass down to the next generation. The motivation to center her value in a space that she deserves to be in is certainly something I imagined her grandmother also did.

Whether internally driven or influenced by others, all participants were college bound. Akosua shared that though her decision to go to college was her own, having six siblings who all went to college set a standard. She shared:

It was my choice to go to college. So I feel like nothing really needs to hold me to stay, like I'm never fighting with "Ugh, I want to drop out" because I know if I dropped out, like, what, what am I going to do? How am I going to feel financially stable? And so, I mean, finishing college is a given for me because, as I said, I have six older siblings, and they've all gone to college, and they've all finished. They're all very successful. They are role models for me to want to make better decisions for my life.

All student participants expressed gratitude for role modeling, motivation, and support from their family and community. Familial capital highlights the reciprocal relationship between student

and family. Student participants drew from their familial capital to achieve educationally and contribute to the evolving lineage of their family and community.

Aspirational Capital

Aspirational capital focuses on creating and maintaining hopes and dreams while facing challenges or doubts (Yosso, 2005). Familial and aspirational capital had the most intersections within this study. Many student participants' belief in themselves and drive to succeed postgraduation was grounded in their families and communities' traditions and encouragement. Aspirational capital manifested in various ways, but the fundamental connection was based on the larger societal context of advancing social and economic status. For many participants, the pursuit of engineering was a new adventure they encountered with little background knowledge from their families or communities. Leaning into support and role modeling from their peers in the NSBE was fundamental to their path so far at USD. This section highlights three key themes, which include: (a) NSBE Influence on Aspirations, (b) Internal Drive, and (c) Overcoming Distractions to Aspirations.

NSBE Influence on Aspirations

The NSBE (n.d.) supports its membership's academic and professional development. Guidance and drawing inspiration from peers were constant narratives through all participant stories. Bill acknowledged that getting to know NSBE members and learning of their accomplishments was a factor in keeping him committed to his engineering goals. He shared:

So, what's keeping me really committed to my goals is just seeing that I'm not the only one that goes through the tough grind, you know? I'm able to constantly see people in NSBE that are graduating with great job offers or fulfilling all the things that I have

aspirations to do. So that's what really keeps me going, you know, knowing that it's not out of my reach, I just have to work for it.

Barry was also influenced by other members' success and drew attention to the value of being around groups of Black people doing good versus otherwise. He said:

I think the biggest thing with NSBE, and like contributing to myself, as an engineer, was just seeing all of the other Black engineers and everybody like doing something because usually, if I see a whole bunch of black people, it's like they're acting crazy, or like some wild stuff going on. That's not good.

Ashley, a longtime member of the organization, highlighted why NSBE is important on campus. She said:

One of the biggest differences between NSBE versus other Black organizations is that we all have a common goal of graduating as an engineer. Graduating from USD, period. That is the goal. It doesn't matter what your major is, doesn't matter if you're in STEM or not; we want to see you graduate.

Peer-to-peer support has played a pivotal role in the chapter's success and membership.

Many students referenced Ashley as a significant influence on them as a student in NSBE. Bill credited her for being influential to his path to earning an engineering degree. He shared:

I can easily say that Ashley has been major in my life. I can go on and on about how helpful she was for me in pursuing engineering. She was able to really guide me to what NSBE is, why NSBE is around, what NSBE does, and why I should join, you know, and it was definitely major for me and wanting to do engineering. To see someone who has a similar background and is doing it. So definitely that person for sure. Shout out to Ashley.

Chloe has a similar sentiment. She said:

Ashley was a big part of me getting into NSBE. She's always been there for me from Day 1. And like, I remember when we went to the national convention, we were sitting outside; I think it was like Snapchat or waiting to get into a luncheon meeting. And we're talking and then she introduced me to what her major was, and she was telling me about it, and I was like, Oh my god, that sounds so cool. What is that? And like, she pretty much persuaded me to join [my major]. So that was definitely a turning point in my life

Though involvement in the group has professional and academic benefits, personal growth was also part of NSBE's contribution to student success. Kyrie has been a leader in NSBE for several academic years and noted how important NSBE has been to his ability to build strong communication skills. He said, "I would say overall like communication is really key to all forms of success and being able to be successful, and NSBE has really contributed to that by helping me take on different leadership positions." Marshawn shared that the positions NSBE has put him in allowed him to build character, particularly in White-dominated spaces. He shared:

Now, character-wise, NSBE did shape my character a lot. Because any experience that you go through, it causes growth, and that growth can be unpredictable. And it can be invisible. It's just a form of growth. You're never ready for it until you actually get it. So NSBE did help me grow. Definitely, character-wise, it put me in a lot of situations that I have never been in before. Put me in a lot of situations where I had to become more accustomed to the way the White world works—and being able to manipulate and maneuver through that realm of things.

CCW was positioned in this study to offer an antideficit counter perspective on the adversity Black students face in the engineering educational system at a PWI. As highlighted in this section, NSBE seeks to do the same. Involvement and guidance through this student-created community has provided members with access and awareness of the tools and resources available to navigate educational and professional systems not necessarily built with their success in mind.

Internal Drive

Internal drive was an ever-evolving source of capital among student participants. I define internal drive as the internal motivation one draws on to focus on their goals and push through barriers or challenging times. All sources of capital within the CCW framework can contribute to the makeup of this intrinsic form of drive and motivation. Growing up, Kyrie attended a predominately White private high school, which was not close to his home. That educational experience offered him insight into how his White peers lived and drew a direct connection to his aspirations and inspired him to live a happier life. He shared:

Growing up, with my house being full and everything, I would say like being kind of cramped too and seeing my family, not having a lot of money. But then I would go over to some peers' houses, most of them White too, and seeing that they had a lot more seemed like, to my perception, they seemed happier. And I was like, wow, I want that. And then now even saying, like, oh, wow, I want that for my kids as well. And that always pushed me to want to be better working every day at that.

Personal triumph was also used as fuel to achieve. While discussing hope for the future, Bill expressed that he hoped future employers go beyond traditional candidate reviewing methods and see that he has an internal drive to succeed as an engineer. He said:

I might not be acing everything or doing the best, you know, and honestly, I hope one day, if I have a business that wants to talk to me, I could truly reflect on who I am as a person. Hopefully, they understand that, but I just have a drive to not stop. And once I truly master something, I will be great at it. You know, so if anything, resistance just keeps me going.

With big dreams but little experience, Lonnie highlighted the power of working hard and creating what did not exist. His attendance at the NSBE convention presented an opportunity to network with The National Aeronautics and Space Administration and, ultimately, secured a highly coveted position within the company. He shared:

I'm still in shock about it. Because I feel like it's a big gap to clear, you know, building experience when you don't have that much. But as soon as I found out that I had gotten it, I was very excited, and I told all my friends I work at NASA now. Getting to this goal I had and seeing my hard work pay off, I can now create even bigger goals and aspirations, and like, I'm already setting sights on new things.

Lonnie recognized the inequities he faced as a Black man in pursuit of a career in astronomy. By attending the NSBE convention and using the resources he had accessible to him to connect with NASA, he could shine a light on what drives him to succeed as a future scientist.

Overcoming Distractions to Aspirations

For some, great ambition comes with great expectation and pressure to support those who have provided support along the way. When asked about what distractions arise when working toward his goals, Elijah switched the language in the question from distraction to responsibility. He shared his indifference about his positionality within his family and the obligation to provide, saying:

Um, I think family distracts me. You know, I mean, I think this is just a responsibility that I feel. I'm at that age now; I'm 20 years old. And it's kind of like, well, I do have a responsibility, you know, to kind of be in a position to give back to the people that kind of raised me, but at the same time, like, I don't want to have to feel obligated to do that. Yeah, I don't know. It's just something that I struggle with every day. And when I think about it, my opinion on it changes.

When asked to expand on his struggle, he affirmed his commitment to contribute knowledge and resources to the aspirational and familial capital of those in his family. He said:

I think it's an accumulation of those things. One of those things was I am the only male, right? And then only male who went to college. And, you know, [I'm] doing the entrepreneur stuff. And then, everybody in my family calls me for advice, or even like my little cousin who was having trouble with her school deposit, I was able to help her pay her deposit. So, it's like, just stuff like that.

Competing responsibilities can also present as a distraction. Like Elijah, Bill offered a different perspective on what he considered a distraction to his aspirations. With dual commitments to athletics and engineering, Bill offers his thoughts, saying:

In terms of an educational route, I wouldn't refer to it as a distraction. But I do have prior commitments. With school, I am committed to a football team, which is also a big community for me. And I wouldn't refer to it as a distraction. But in terms of the long-term goal, I do really want to be an engineer over anything. You know, so in terms of purely what I want to do, and my future, it could be considered a distraction, but I wouldn't be who I am today without that aspect of my life, you know, because that, that's what really molded me as a person.

Many of the male participants identified as student athletes at some point in their collegiate careers, but left their respective sport for one reason or another. This departure, in turn, opened the door for a stronger focus on their postgraduation plans and pursuits. At the time of this study, Bill was the only student participant active on a sports team. Bill offered a metaphor for the competing engineering and athletic identity that he proudly owns. He stated:

I don't know if you're into comics or anything [but] this is definitely a Bruce Wayne/Batman story. You know, okay, I'm trying to do two things at once and, it's rough to try to do those two things, but it definitely keeps me going that way. And when those two things are firing at the same time, at full capacity, it's a great thing, you know.

Alton found himself distracted by comparing himself to his peers. He said:

Comparing myself to other engineers on campus. I constantly see myself doing that. And I had to remember that a lot of them had, like, private tutors in high school. And, we just aren't on the same playing field. They're really doing it. And I'm over here just trying to get through. So yeah, I would say that just jacks me up. It's like your worst enemy.

He also knew that he could learn from others and centered on listening and absorbing what he could from those who have successfully navigated the pursuit of an engineering degree before him. He said:

When I listen, I feel like I'm learning a lot. When Ashley talks a lot about her experience, it's like, she's very well-spoken. And she talks about tips in general [on] how to approach the conferences and stuff and stay professional and what to ask and what not to ask. A lot of my friends, a lot of people that I study with, they've played a major role in like, keeping my vision and keeping me focused. I can do this.

Navigational Capital

Navigational capital is the ability to maneuver through institutions that are not necessarily built with communities of color in mind (Yosso, 2005). This source of capital offered the most insight into the realities that plague Black students physically, emotionally, and mentally navigating a majority White space. Much of the dialogue led to emotions around racism, skin color differences, and feelings of not being “enough.” As a Black student and administrator on the same campus, this component of the data collection process resonated with me and my experiences. This section of the chapter highlights three key themes, which include: (a) Assumptions About the Institution as Black Students, (b) Relationship to the Larger Black Community at the institution, and (c) Navigating Institutional Racism.

Assumptions About the Institution as Black Students

Adjusting to being Black at a PWI came in many forms. Navigating a PWI was not as difficult for many student participants who have been doing this since grade school. Elijah’s high school experience prepared him for his introduction to USD. He shared:

This kind of goes back to me going to that high school, right? I think for me, I was extremely fortunate because instead of going to like an all-black high school and then coming to this school, I went to the high school that was literally USD. I’m talking like, White, liberal, private institution. My high school [was] 70 grand, the same price as USD. Living on campus right by the beach. Same thing.

On the other hand, Barry, who attended a public high school, experienced culture shock coming to a PWI for college. He said:

Like not seeing other Black people at all like that, and just the culture of more like preppy, beach, like laid back easygoing people at USD, was like a lot different. There’s a

lot of differences that I just noted like the different music people listen to, the way that people talked was different, and the way people did school like the academics was super different. It was a lot more challenging than in high school. Yeah, there's just a lot of differences.

Low expectations of inclusion into USD were a consistent theme, regardless of previous educational experiences. Elijah expressed a reality that one cannot be shocked at a lack of inclusion of Black students when the institution was never built with Black students in mind in the first place. He said:

I can't expect too much just because, like I said, this institution isn't really made for us. So it's like, when you make a business or when you make a school, you apply it to the people who are generally going to come. If you're a White girl coming to USD, it's in your favor, or White male [it's] in your favor.

Akosua entered the institution through pipeline programs built to acclimate students of color to campus. She participated in the "Me @ USD" program administered through the university admissions office. This program offers potential Black student admits a 3-day visit to campus where they stay with current Black students in student housing and engage in campus-related activities. Akosua also engaged in a summer bridge program through the Office of Student Support Services (SSS), which allowed her to move onto campus a week before the start of her 1st year. She met fellow students of color and connected with faculty, staff, and administrators early in her college career. Assuming the institution would be as ethnically diverse as she experienced during her precollege visits, she offered gratitude to the programs that helped her adjust to campus life early on, saying:

I would say, when I first visited USD, it was through Me @ USD. And so I don't know? That just gave me the expectation that USD was so diverse, so inclusive. And then I attended USD, and it was just so much different. And so, I mean, I'm so grateful for SSS and Me @ USD.

Akosua's navigational capital sources grew because of the social networks she acquired through participating in these preparatory college integration programs. Black students are a small student population at USD, and numbers are even smaller in their respective majors. Like NSBE, holding space for Black students to build networks and provide support for each other is foundational to navigating the campus cultural environment at USD.

Relationship to Larger Black Community

Not being "Black enough" is an interesting, albeit honest, expression of the exclusion some Black students feel when entering majority Black spaces on campus. When asked how she engaged with other Black students on campus through friendships and student organizations, Ashley shared feelings of exclusion from the beginning of her time at USD. She said:

I did not have a lot of Black friends. Nor did I feel too welcomed when I came to USD. Even though I probably was one of the most prepared for USD. [It] made me question my own confidence in those Black spaces. Because I wasn't loud and flamboyant and didn't share my opinions all the time. That made me a sore thumb that I guess no one wanted to be friends with.

Contrary to what Ashley experienced, Marshawn was welcomed when entering USD, but the participation demands left him overwhelmed and uninterested. He shared:

The most challenging aspect [of navigating campus] was trying to deal with the Black student situation. Why aren't you hanging out with us? Why aren't you doing this? Why

aren't you doing that with us? And I didn't feel like it. I was doing what I had to do. I was making my legacies doing what I wanted to do, furthering myself.

Elijah has been a member of several Black organizations and believed these groups can espouse incongruent values. An organizational mission can be to uplift and empower students, but what a student experiences can be on the contrary. He shared:

I feel like I've been a part of a lot of different, like Black organizations, and I feel like there's a lot of Black organizations that kind of [have] a front that says that they want to be for Black people when really, they're not, or they're just not helping, you know, place you in the best ways.

This inconsistency led him to NSBE, where he found community among Black peers while also growing professionally. He said:

But I think NSBE is one of those things where a lot of my mentors that I looked up to and a lot of people that were in certain fields that I wanted to work in, they all are part of NSBE. It's interesting because there's a lot of connections, and the networking is everything.

The NSBE organization was identified as a welcoming space for all student participants. Ashley summed up her thoughts on the impact and positionality of NSBE as a leading student organization in the school of engineering and among the larger NSBE society. Involvement in an organization that expands beyond the confines of a college campus to provide unique access to a larger engineering community inadvertently creates tighter bonds and a sense of belonging among members on campus. She said:

But I think [the] USD NSBE chapter is definitely something that's special. I think we have the support and the resources at our disposal, which is part of the reason why I

chose USD to begin with. We're changing people's lives at USD and outside of USD.

And so I think we have an advantage over some other NSBE chapters, and that we have this amazing amount of support with, with companies, with alumni, with faculty, with administration with students, we have people who are invested in seeing the success of students.

Black students can have similar experiences at a PWI, but it does not mean that they are a monolithic student population. Not all Black spaces are inclusive environments for all Black students, even when the assumption is that they should be. There is a great expectation of being a part of cultural organizations at a PWI because the latter could mean more isolation. As mentioned previously, NSBE offers an intersection of community and professional development, which allows its membership, although all different, to share a common goal: to graduate and become engineers. More about this topic is discussed in the following section about social capital.

Navigating Institutional Racism

As mentioned earlier, navigational capital shines a light on the savviness it takes to overcome uncomfortable events and experiences that many in the majority race at a PWI do not have to experience. Navigating institutional racism was an act of survival in many cases during this study. Many institutional agents, microaggressive peer-to-peer interactions, and blatant racist actions impacted students daily. The ability to brush issues off or ignore them, though not ideal, is a source of navigational capital. Several participants discussed the covert racism or ignorance they have experienced from interactions with their peers. Elijah explained:

The White people here aren't overly? They're not racist. I would say the people here aren't racist; I would say more from an ignorant point of view or more like a, like, White liberal, you know, that's, that kind of speaks for itself.

Kyrie addressed the reality that some of his friends did not recognize the privileges their upbringing has had on their college experience. He said:

I would say one thing that came to my attention recently, like, people with college funds with their parents. Having friends that say, like, "Wow, I didn't feel privileged growing up," but then realizing, oh, your parents had a college fund for you and had you kind of set up for that? Even if you might not need it, they still had it set up. I never had that. And I always knew that I had to figure out some way to get to college, if that was through scholarships, or being able to work around like loan situations, and other ways to be able to go to college because I knew that like, my mom couldn't, or my family couldn't support me financially in college at all.

Lonnie named his exchanges with White peers as "slight racism," especially from his peers who have not been around many Black people. He shared:

There are a lot of instances where my peers would be slightly racist. The social norm is just kind of like, it's not acceptable to be completely blatantly racist. However, the internal thoughts and implicit biases still show up and come out a lot around students, especially if they haven't been around Black students before. And, that happened a lot.

Physically being a different skin color than most peers on campus also took its toll and impacted how one navigates a PWI. Alton spoke to the uncertainty and discomfort he felt touring campus before attendance and what he still experienced as a current student. He said:

I did kind of get that vibe when I was here touring the school. Like White people would just stare. Yeah, they still do that. Like, even if they've seen you before. Are they staring at me because I'm Black? Or are they staring at me because, you know, like, they've never seen me before. You can never tell.

Zay expressed there is power in numbers, but the stares are just something she has had to accept, whether alone or in a group. She said:

I was definitely aware of my Blackness. I know when I walked around with other students, I felt more confident, you know, other Black students or with my teammates or something like that. But if I'm just walking by myself on campus, I'm kind of like, Mmmmm . . . I know people are staring. I know, they're looking at me. I feel this weirdness surrounding me. So yeah, it's something I had to learn to kind of just accept [it].

Physical differences coupled with assumed stereotypes can create a space where hypervisibility and invisibility coexist, particularly inside the classroom. Kyrie explained the awkwardness of people knowing him because he is the only Black student in his engineering classes. He said:

Whenever I go into an engineering class, everyone's going to know who I am. But I'm not going to know who they are. But they're gonna know the only Black person, or even, not even only Black person, but the only big Black person in the class.

Navigating a PWI can be difficult, but unapologetically asking for help is a powerful tool all participants used. Barry explained the value of asking for support when he needs it, saying:

I would say, just don't worry about other people's opinions of stuff. If you need help or clarification on something, you got to find the resources, ask, and try to get as much help

as you can. Ask other people, your classmates, if you can, if you have relationships with them, or any other peers that you think can help you. And professors, too, I found that professors are, most of them are pretty cool if you just go see them in office hours. So take advantage of that. And just don't worry about other outside opinions too much just do you

Beyond college, being Black in engineering and technology workspaces also requires cultural capital to navigate environments not necessarily built to support the retention of Black employees. Alton believed the racism he experienced at USD will better prepare him for a world of work that is also not ethnically and culturally diverse. He shared:

The reason why I chose a PWI is because I'm in the engineering realm, and that's the majority of who you'll be working with. So I'd rather get those racist interactions now than later. I feel like this is training for the real world because engineering is not all Black.

Historically, the Black community has been forced to adjust to the dominant culture's norms. This learned invisibility compromises a student's ability to express themselves fully. Capitalizing on the social capital accrued through the time spent effectively navigating their institution was a critical factor in overcoming issues of inclusion and acceptance.

Social Capital

Social capital addresses the networks and community resources students use to maneuver through colleges (Yosso, 2005). This chapter section covers the most salient aspects of this capital source, including (a) NSBE Convention and (b) Meaningful On-Campus Connections.

NSBE Convention

A benefit of active membership in the NSBE organization is attending the annual national NSBE convention. The NSBE convention hosts upwards of 17,000 attendees looking to build networks, find community, and secure employment in engineering and technology fields. Top employers looking to diversify their workforce attend conventions like NSBE to engage, interview, and, for some, hire on the spot. This convention is a “game-changer” that students who have attended say opened doors they never knew existed. For Chloe, attending the convention early in her college career helped her select the academic major that was right for her. She shared:

So the very first national convention I went to, that is where I decided I wanted to be an . . . engineering major, it was that convention, it was that conversation I had with Allison, it was the event I went to with Ford, where I was like oh my God, I had no idea this was even a thing. I had no idea it was even a major at USD. And this is totally what I want to do.

Career planning and preparation play a pivotal role in prepping students to get the most out of the NSBE Convention. Resume workshops, student attendee panels, and social networking are covered prior to attending. Ashley felt the USD chapter prepared her for getting the most from the convention. She said:

Kind of putting into action a lot of the tips that we learned from USD like you make sure you send them a follow-up email, you make sure you get their contact information, you stand out, you have your elevator pitch already prepared. I think I had all of those boxes checked.

Securing an internship and job opportunity was the main priority for all students who attended the convention. When asked about the social capital acquired through attending the national convention, Lonnie shared his experience of having a direct line of communication with his dream employer, NASA. He said:

I'd applied to like a wide range of NASA jobs that I was really interested in, all of which were really competitive and really hard to get into, especially as a physicist trying to get into engineering, intern, and technical roles. But at the conference, they did this thing where they sent out all of student resumes to different all the different company recruiters and stuff. And from that, a company recruiter from NASA reached out to me and said they wanted to talk to me and learn about me. And they said that we got your resume from the convention. And because I submitted it, from there, I got my current job, which was just a stroke of luck.

A convention explicitly for Black professionals and students in engineering and technology may imply that companies are simply looking to meet a "diversity quota." Students consistently have to reconcile feelings of uncertainty around whether they earned an opportunity because they have the talent or because of their race. Kyrie offered his perspective on filling an organization's need for diverse candidates and hires, saying:

The companies need us a lot more than we need them. And so, it has shaped me in that perspective. I am valued very much. And also, being able to provide value to these different companies as well. NSBE has helped contribute to that by helping me get into different opportunities.

Countering the invisibility many students can feel at USD, attending a national NSBE convention was a high-visibility moment for all of them. Students can share their successes on

social media platforms, gain institutional support as a member of a minority organization, and have the potential to secure an employment opportunity with a top employer. For a few days out of the year, the participants presence at the NSBE convention offers them accolades and campus pride for representing the university on a national level. This positive attention can come in stark contrast to the feelings of working twice as hard to be viewed as equal. Additionally, they see people who not only look like them, but who have also developed mechanisms to work and continue building on their sources of capital as professionals in engineering and technology.

Meaningful on Campus Connections

As a Black administrator, NSBE advisor, and career counselor, I had multiple touchpoints with each student. Elijah sought career counseling assistance and shared how important that support was for him as a student who struggles with dyslexia, saying:

I would say you've been pretty valuable. I would say you I mean; I also think just kind of being able to schedule appointments and just kind of talk to you about, you know, like resumes and how to write, you know, better resumes and cover letters. I think because I struggle with dyslexia, having another voice to say, oh, like, this wording sounds good. Cause I feel like I have the ideas, and I have the creativity, but some little stuff that I actually need help with is like changing some of the language.

Marshawn discussed the benefit of having an involved advisor committed to supporting him as a leader, saying:

Literally, like what I did, what I accomplished, I wouldn't have been able to do at NSBE without sitting in your office and painstakingly going through the things that we did. I hope you understand that. Like, I needed you to help me a lot. Because it was, I knew I

had to do it. But at the same time, it's just like, dang, I got to do this. And this and this and this. So I just needed some time dedicated to just NSBE. And then you were also very helpful with all the connections, and I wouldn't have been able to do what I did without our weekly meetings, without interacting with you or meeting you.

Influence as a career coach and advisor has boded well for me as I sought to garner trust from students. Kyrie shared what happened when he followed up on an email I sent out about opportunities at Microsoft, saying:

When Microsoft reached out to you, you sent out a letter to all the NSBE students saying you guys should apply and apply from there. And then now being able to have the great opportunity to work there. And everything has provided me an opportunity that I didn't even think that was possible or didn't even think was in the realm of opportunity.

SSS is a grant-funded program that seeks to increase college retention for students who identify as first-generation, low-income, underrepresented, and who have documented disabilities (Student Support Services, 2021). Many student participants in this study came into the university through SSS and continue to use their knowledge from participation in the program. The welcoming environment they create for students is a primary reason Akosua continued to seek guidance from this department. She said:

I mean, the environment they [SSS] created is very welcoming, like they let us know this is their job. Being Black in engineering and technology requires cultural capital to navigate spaces not necessarily built to support the retention of Black employees.

SSS also provides direction with seeking financial aid from the institution, which is a constant challenge for Kyrie. He shared:

Like financial aid, needing money like every year, I know that they would never like initially give me enough finances to survive or to live. So one thing that SSS told me in the beginning, I remember, is [to] write a letter to financial aid. And every single time I wrote a letter, and I would always go to them, and even, maybe even multiple letters. Finally, money would appear.

Meaningful relationships with faculty were also important social capital. Coming into college, Ashley was unsure of her math abilities; one positive interaction with a professor changed all of that. She said:

I would definitely say Dr. F; she has been tremendous. When I came in, I was like, I'm gonna hate this. I'm gonna be so bad. And then in the class was I was doing well. I was like, oh my goodness, that was the first time I genuinely enjoyed going to a math class. And she would check in with me and send me emails here and there about scholarships I should apply to and research programs that I needed to do. And she would put my name for a student assistant, and I was like, wow, she's really putting me out here, right? Oh, my goodness. And it sat with me because she believed in me so much. And I didn't even really believe in myself.

Marshawn expressed gratitude to the whole village that offered guidance and support throughout his journey through college. He said:

I would say I've been fortunate enough to have a lot of people touch my life in ways that they don't even comprehend. Like they've helped me. A lot of people have helped me, and that's why I think that my idea of family changed. It is not based on your blood. It's about people who are investing in you, as well.

As the NSBE advisor, I can undoubtedly align with what the participants hoped and wished for, as I want similar things. Benefiting from the college knowledge and social capital of others is a way to “lift as you climb.” Student participants each identified the social capital they have used or accessed during their time in college. This deployment of capital allows students to benefit from their connections and position themselves to offer this intel to their peers who may find themselves in similar circumstances.

Linguistic Capital

Linguistic capital identifies social and communication skills in more than one language (Yosso, 2005). Interpreting linguistic capital was difficult for student participants to recognize when explained from a multilanguage perspective. Discussing code-switching’s spoken and unspoken language proved to be a strong pathway into opening participants up to the linguistic capital they access regularly. Linguistic capital also refers to communication through a connection to language in music, art, and scholarship. Words hold power, and Black artists who share their journey can be a profound resource to Black students who have to curate their own ecosystem of support at a PWI. This section of the chapter covers the most salient aspects of this source of capital, which include (a) Code-Switching, (b) Exclusive Language in Engineering: Kyries Story, (c) Hip Hop Music, and (d) Black Scholars.

Code-Switching

For the sake of this study, *code-switching* is defined as knowingly or unknowingly adjusting language, attire, and behavior to optimize the comfort of others. The art of code-switching is longstanding among Black people who have to navigate majority-White spaces. Academic institutions are no exception. Adjusting to White norms is a way for many to seem relatable when skin color is a clear display of difference. Marshawn used the art of emotional

intelligence to strategically engage in dialogue with White people from whom he seeks buy-in. He said:

Understanding like talking to a White man. What does he want to talk about? Not necessarily what do I think he wants to talk about? So kind of probe in the beginning and talk about sports, talking about sports, talking to the White woman, probably talk about their kids? Let's talk about their kids.

Marshawn, who has spent significant time in both majority-Black and majority-White communities, had a strong understanding of how important it was to traverse both spaces—that is, to not only survive, but to achieve success. Now that he is professionally positioned where he is comfortable, he feels free to be himself. He shared:

Both sides might look at it a little weird, but both sides would accept it. Now, when it comes to being able to go to one end of the spectrum, I definitely can. But, in the past few months or so, I've kind of been thinking about this a lot in the sense that I needed to act more White to get a job. I needed to act more how people wanted me to act, to get into the position I am today. And now that I kind of have some foundation under me, I just talk however I want now because what are you gonna do?

Speaking “White” came up quite a bit for those who have spent much of their upbringing and education as one of the few Black people within their friend groups and classrooms. For Chloe, code-switching was not a conscious choice, nor was it one she fully relates to. She said:

In the definition of code-switching that I know it to be, I don't do it consciously. Yeah, just because I've gone to PWI's my entire life. So, it's not like I'm from a different world. I've seen memes on it on the internet about code-switching and stuff like that.

Sure. I get it. But I don't necessarily relate just because I grew up in a predominantly White area. So I'm obviously going to not be White. But I'm not stereotypically Black.

For students of color, assimilation into traditional educational systems at an early age also came with stereotypes that can be harmful to identity development. Lonnie shared the cultural disconnect he experienced in classrooms at an early age that shaped his identity. He said:

I feel like very early on, my whole identity was code-switched. Especially when I was like, in the South, there are a lot of like stereotypes and like, for like Black men, especially like Black boys. And like, if they're too energetic, or if they're loud, or don't listen to directions, it can just be seen as like a number of things, but just mostly like, like problem child is what they really write you off as or as delinquent.

This conditioning, good or bad, created a more logical and clear-headed student persona for Lonnie. Lonnie shared:

And I think from that point on, I slowly changed from a more outward-facing kid to someone who was a lot shyer, especially around White teachers. Generally, within a White community, I make sure I talk very clearly. I make sure I'm very clear-headed and logical, and that's just become a part of my identity. To kind of not be as energetic or, as you know, I guess threatening to some groups.

Exclusive Language in Engineering: Kyrie's Story

For Black students, classroom discussions on slavery, civil rights movements, and constant racial injustice in the news can be uncomfortable and position them in the space of needing to "represent" their race. Finding ways to build inclusive language into course curricula can impact students and support their overall learning; however, there are times when harmful language is so deeply embedded within a discipline or field that it can be seen as a "disservice"

not to teach it exactly how it exists in the industry. Kyrie shared a personal battle he faced with an issue of offensive language. He said:

So, in . . . engineering, I was a junior; when I first heard it, there's the term like "master and slave" components. And it's what's used in the industry and everything too. And when I first heard it, I just automatically, you know, felt uncomfortable. That can be changed to something different like "leader and follower" like, you know, anything else.

With this figure of speech being standard within this engineering discipline, it was never named as an issue. Propelled by his concerns and position as a senior and Black student leader on campus, Kyrie decided to address the issue with a professor. He shared:

For one, being at a predominantly White school, and also having it used in the industry a lot, it just kind of goes over [people's] head, and made me kind of feel like? Hmm? It wasn't even kind of talked about with any of the teachers, or at least at first, and then I came into my senior year. I voiced some dislike in terms of that, and luckily enough, in my last . . . engineering class, my professor actually reached out to me. [He said that he was] gonna do everything he can so he doesn't say that terminology but has to, just to warn me though, like, he has to tell the students like, this is what's used in the industry.

This concern being addressed was significant for Kyrie. He felt heard and included in a way that he had not experienced before. His voice mattered. He continued:

And I was like, thank you for like, even just reaching out to me. Makes me feel like people care about it. It made me feel this was going in a really good direction and made me feel more comfortable that other people feel the same way as me, even if they didn't look like me. And if I never got reached out to or didn't have different group conversations on different racial injustices that might happen at this university, it might

not have been talked about just because I would have been quieter and kept it inside more.

Continuing to assert support for Black students without taking action against structural and systemic barriers to academic achievement for Black students is a fundamental problem in education. The emotional taxation it took for Kyrie to sit through engineering courses was significant enough for him speak up and face potential social repercussions because of it. His story, though meaningful, adds itself to an endless list of everyday occurrences minority students are expected to be mature enough to overcome.

Hip-Hop Music

Storytelling is a powerful tool to pass down information from generation to generation. During the days of U.S. slavery, many enslaved peoples were persecuted if they read or wrote, so the power of voice was central to kinship, ancestral history, and, in many cases, survival. The complex and often contentious history of African American people illuminate the importance of contextual and historical influences on storytelling and storytaking (Banks-Wallace, 2002). Rap music and hip-hop culture is a strong anchor within the Black community, allowing artists to express themselves through music and lyrics. For all Black males in this study, urban music was a longstanding tool used as a source of relatability and motivation—Elijah shared why rapper J. Cole resonated with him and his lived experiences, saying:

J. Cole had this album called “For Your Eyes Only” that kind of talked about the struggles of, you know, children growing up in the hood. But yeah, so when I think going to high school, and just kind of a situation where I would stay at my friend’s houses [that] were like multimillion dollar houses, five bedrooms, you know, Rolls Royce in the garage like big lookout to the golf course. Right? And then I would come home, and I

would have to be struggling for like food, you know? So, I mean, in his album, he talks about it more from like an interracial standpoint, being like half White, half Black, kind of meeting in the middle as a light-skinned child. And I feel like even though I'm a very dark-skinned man, I think the two worlds still kind of intertwine.

Kyrie was also a fan of J. Cole for his honesty and uplifting message. He said, "I'm a big J. Cole fan. Let's me think deeply about what's going on in my life and understand that everything will be kind of better."

For Barry, the music of rapper Nipsey Hussle helped him get through the ups and downs of life. He shared:

Number 1 would be Nipsey Hussle. Any album for the most part. Just because the themes of, like, going through ups and downs that he talks about all the time, and like the marathon mindset that he always talks about, I kind of take it as my own like, just keep going no matter what. So it's like if I am ever discouraged, or I don't have a focus on school or anything, if I just put on some Nipsey Hussle, then my focus is right there again, and I'm like, ready to keep going.

CCW provides educators with an antideficit tool to better understand students of color and their path through education systems. Black student realities go beyond what they experience at school. Honoring the relationship these student participants have to their home environment emphasizes the importance of where they come from. Hip-hop music is more than just a simple rap song. It is music created primarily by Black artists who use their lyrical gifts to highlight the plight of a culture; not to mention, music can be accessed walking through campus, eating lunch, and studying for an exam in the library with a set of headphones and a music streaming service on a cellular phone.

Black Scholars

Black scholars have blazed a trail for themselves and opened so many doors for the next generation of scholars to come. Like star professional athletes with legions of young people modeling their game and technique after them, the same can be said for Black scholars named as influential in this study. Lonnie was inspired by the relational capital that comes with reading and watching the lives and journeys of scholars who have come before him. He said:

One of them mainly being like inspiration from others, like other Black leaders in my life, whether it be an astrophysicist like Neil deGrasse Tyson, or the first astronaut, female astronaut Mae Jemison, like, there's so many different sources of inspiration I've drawn on from other people who have paved the path in front of me.

Author Te-Nehisi Coates's book, *Between the World and Me*, was an essential read for Marshawn. It helped him identify his place in the world as a Black man. He shared:

Ta-Nehisi Coates, especially, *Between the World and Me*, that book [is] a letter to his unborn son. That book really spoke wonders to me; it's like, that was more focused on how a Black man is viewed in society and how to prepare or not even prepare, how to be aware of it. And that kind of shifted the way I prepare for certain situations, dealt with certain situations, not necessarily having that hostile stereotypical aggressive personality, but more so a disarming personality.

Lonnie admired creative expression and has consistently sought inspiration and affirmation from the works of James Baldwin, Malcolm X, and Senegalese author Mariama Bâ. He, too, has a powerful story to share, and he looked forward to inspiring the next Black generation of budding Black scholars like himself. He said:

I was just reading as much as I could, just to learn how to express myself and understand what I'm feeling growing up in America. The literature that I read, just trailblazers, reading about and learning about other like Black people who have crossed those bridges have accomplished and have, you know, defied expectations, reading about them, learning about them, just, you know, makes me eager to share my own story and a show world like this new facet that only I can share.

Yosso (2005) believed students who possess linguistic capital may have storytelling traditions as a mode of communication within their culture. Sharing and learning through storytelling dates to the days of slavery for Black Americans. As reading and writing were not an option for many, the power of words and stories became the lifeline of history and traditions passed down from generation to generation. Similarly, these student participants were influenced by Black scholars who have lit a path before them.

Resistance Capital

Resistance capital is the ability to fight against the status quo and actively oppose behaviors of inequality (Yosso, 2005). To persist in an academic major where a student is likely to face feelings of imposter syndrome, stereotype threat, and assumptions based on their skin color is a significant act of resistance. This section of the chapter covers high-level themes from the data, which include: (a) Black Allegiance and (b) Black in Engineering

Black Allegiance

To be a Black student leader at a PWI often means a student is called to contribute their voice, time, and efforts to create a more inclusive and equitable environment for their Black peers. As important as this work is, it can also be laborious, emotional, and take away from the simple joys of being a college student. For Zay, who was a member of several minority groups

on campus, she recalled the immediate call to action she had to spearhead after the brutal killing of George Floyd by a Minneapolis police officer. She said:

So May 2020, of course, George Floyd was murdered. And at the time, we had just like, finished school and you know, how school ends and you kind of take that deep breath. BSU had just had our e-board retreat. And we were like, Okay, well, we're not going to start until, you know, August when things are rolling. And then that happened. And we were like, Oh, no, we have to start like, right now. Like, we have to get to addressing things right now.

Kyrie saw the importance of being present when collective activism efforts sparked within the university. He said:

Making sure I am being present in all situations. If the [Black] students, you know, are trying to send a letter to the school, I want to be a part of that, too. And to make sure that like being that support, and to know that whatever we need, and just to have that support for everyone.

Though Kyrie was happy to contribute to these efforts, he still acknowledged how difficult it could be to know exactly how to make things better. There is often an expectation that Black students need to be brave enough to call out inequity and be prepared with answers on how to fix it immediately. He said:

And sometimes it felt like in some meetings, like pressure, like, what is wrong, like, we need to know exactly what's wrong and what are direct changes we can make? But a lot of it's like, in my opinion, there are changes that need to be made. But the actual steps, what can we do today, and actual steps to change those? It's kind of like hard, you know?

The suppression of Black voices empowered Akosua to lean into activism efforts on campus. She wanted to contribute to creating a better environment for the next generation of Black engineering students and knew if she did not speak up, others would speak for her. She shared:

[Advocacy for Black students is] something I lean into, because I mean, I think about me as a student now, I wish someone leaned into changing the atmosphere for Black students in the school of engineering. So I feel like the only way we can change that atmosphere is to be a part of those conversations. Because if you're not here if you don't have a seat at the table, you're the one that's being talked about. So, I mean, we have to be that voice because then other people speaking for us will not get what we want.

Pledging collective allegiance to create a better environment for Black students at an institution is a significant feat. These student participants also held positions of formal and informal leadership on campus. Their physical presence is often expected at campus gatherings that discuss the harsh realities for Black students, even when that reality might not be one they are living. Low attendance can mean inadequate care and concern as a collective around issues of racism, lack of inclusion, and acts of intolerance. These expectations are often taken further when there is also an expectation of having answers and solutions to bettering an environment that has systemic issues. The knowledge gained through mobilizing a call to action at USD, writing a list of demands, and facing university administration as a collective force contributed significantly to the accrual of resistance capital.

Black in Engineering

Stereotype threat is an interesting phenomenon where an individual conforms to a negative stereotype commonly associated with an identity they hold. Battling stereotype threat is

something all student participants expressed they experienced in their own way. Allison acknowledged this threat but refused to be a part of a societal stereotype. She said:

I want to make it in the world, like. There's so much pressure being like a Black person that everyone just kind of expects, like, Black people, to not be as successful as White people. And I just don't want to be a part of that stereotype.

The “prove them wrong” syndrome was an act of resistance to stereotype threat. Barry's journey through an advanced math course described how a student can take a stereotype threat and turn that into fuel and drive toward success. He said:

So I had to go from the bottom of math all the way to calc 3. So it was pretty hard to do that, especially with the math program here. But when I was taking calc 1, I had like a C-, like midway through the semester, like 70%, and went to talk to my professor. He said that he thought I should drop the class. So when he said that, it kinda was like the “prove them wrong” syndrome; I think it was instantly activated. And after that, I was in tutoring every day, just trying to do as best as I can. I did so well on all the other exams and homework assignments. And had like a C+ at the end of the class.

Imposter syndrome can be defined the persistent inability to believe that one's success is deserved or has been legitimately achieved as a result of one's own efforts or skills (Oxford English Dictionary, 2021). Lonnie understands firsthand the internal conflict he has faced when constantly working twice as hard to be seen as equal. He said:

The main thing that might distract me is even though I say it is a source of power, I think, for people who have been discouraged and have been labeled and written off, even though they may take that as a source of pride to say, I'm not that, I think imposter syndrome is something that a lot of people deal with. And that internal struggle whenever

they don't rise up to the expectations [they place on] themselves. [People who] take this path of like, I'm going to prove them wrong, also have very high expectations of themselves. And I feel like that struggle of, "Am I as good as I believe I am? Do I have this potential?" Sometimes, it can be really damaging, especially when you don't live up to it.

He said this thought cycle can lead many right back to the safety of stereotype threat. He shared:

And those thoughts, you know, it can make you feel like you should just take the easier path sometimes. Um, and, you know, I, I honestly, I don't know how I get through those points sometimes, but I lean on my family for that a lot. And like, I just [am grateful for the] people around me, who are always supporting me and encouraging me.

Though it was not easy, Ashley, like many other student participants, knew she is as deserving to be at USD pursuing an engineering degree as anyone else. She said:

I deserve to be here. I deserve to get an education. I worked equally as hard. I jumped through the same hoops, if not more, to have my seat at the table. And so, the driving factor is to continue to have a seat at the table beyond just where I am present. So that mindset of being okay with being the only person in some of these spaces, and then taking on the responsibility head-on rather than viewing it as a burden, or just not even taking on the responsibility. You being there in itself is an accomplishment and is progress in itself.

Black students who defy societal oppression by employing oppositional strategies that challenge inequality engage resistance capital (Yosso, 2005). This act of opposition can include challenging the image and cultural stereotypes of what a Black student should and should not be in college. Directly or indirectly, student participants expressed feelings of not being held in

high regard on campus in some way or another. Cultivating a personal attitude of resistance to negative self-talk and self-doubt was important when challenging their internal feelings of discouragement and devaluation.

Additional Findings

In addition to the findings aligned with the CCW framework, I want to highlight additional data points that contributed to the research.

Remote Learning

Data were collected 13 months into the COVID-19 global pandemic. This pandemic forced many colleges and universities to close their physical doors to ensure the health and safety of students and employees alike. USD had to switch delivery of instruction from in-person to virtual learning. This sudden campus closure meant many students were forced to move back in with their families and reengage with their current courses remotely. Navigating the responsibilities of home life had its challenges for most student participants, including Akosua. She said:

So I live with my parents, my sister, and my grandparents. So, COVID was definitely not easy for me. Being home and sharing [the] internet with six other people. And then having to take care of them, on top of that, um, was definitely not an easy task.

Many appreciated the support of their family during this time but could not deny the distractions that came with being in a crowded home with overwhelmed WiFi. Adjusting to this new normal was unavoidable for Bill and something that he recognized was a reality for many and not one to complain about. He said:

So I had my mom, who was working remotely, a little brother that's going into high school remotely. At the time, my sister was also working remotely. So it was a lot of

people on the same WiFi. So it was just really rough, you know, to go through my day-to-day with school because you can't do remote learning if you don't have reliable WiFi.

But, you know, at this time, this era in the world, it's not really a valid excuse.

Being forced to slow down and stay indoors opened up pathways to reflection that would have otherwise gone unexplored. With more free time, student participants shared how, if at all, their aspirations were impacted. For Marshawn, planning for the unexpected was paramount during this downtime. He said:

The pause definitely has made me reflect a lot more and try to do or plan out my goals. Plan my ambitions a little bit more thoroughly, with a lot more of a risk factor involved. Like what if something goes wrong kind of mentality, just because COVID happened. So it's made me prepare a lot more for a rainy day than I would have prepared for otherwise.

With such an abrupt change to everyday life, coupled with a worldwide public health crisis, threats to mental health emerged as an expected theme among student participants. Elijah, who was driven forward by his ambitions, was impacted by this abrupt stillness. He shared:

I think the pandemic kind of hurt my mental health in a way as well just because I think when you're alone, or when you're just staring at a screen all day, you're kind of stuck in your own thoughts and I just kind of felt not super productive.

Renegotiating the relationship with school was a constant struggle for most student participants. For some, schooling—which used to be the biggest priority—now became the biggest distraction to their goals. During the school year, Akosua was engaged in an internship that she enjoyed. Throughout the pandemic, her internship became a place she would rather be than at home in front of a computer screen participating in class remotely. She said:

Sometimes I feel like my internship can even distract me just because I'm like, I want to go to my internship. I don't want to do class right now. I want to go to [the job] site instead of class right now. I have the privilege of experiencing what my career will be like after college. But I remember I could not attain this career without my degree.

Emotional and cognitive energy is needed to navigate USD's day-to-day life as a Black student. A break from that came with its pros and cons, but this break was a good thing for most of them.

Spiritual Capital

There was enough data that emerged in the area of spiritual capital that it is worth noting in this study. Though this source of capital falls outside of Yosso's (2005) CCW framework, it certainly was foundational for many of the student participants raised in homes that centered on the power of prayer and trusting in a higher power to overcome adversity. Bill was raised in a religious home and consistently shared gratitude to his parents for ensuring that faith was foundational in his life. He said:

I would say my internal confidence comes from my internal walk with god. [My parents] definitely molded me to be able to be in these moments where I might be by myself and still have the voice of their voice touching my mind that I'll be okay that I can do this or I'm not lacking in any aspect of life, you know, and I've been able to really help myself. Because moments like these, I'm definitely on my own. So I use their past coaching and my internal walk to get me through those moments for sure.

Similar to Bill, Allison relied on the power of prayer when her confidence was lacking. She shared:

Good prayer always works. Like, yeah, like, God, like, please help me through this time. Like, I just need strength, because there are some days where you just question it all like,

Why? Why am I doing this? Why am I putting myself through this? So a good prayer always helps.

Although not specified in the model, spiritual capital is worth noting in this study. For those students raised in homes that prioritized faith and religion, spiritual capital intersected with family and community upbringing. As a concluding question, I asked students to speak of any other forms of capital not yet discussed in the interview that have been activated during their time at USD. A few students identified prayer and the act of praying as a personal self-care practice.

Financial Capital

Like aspirational capital, financial capital was a driving factor for student participants who may be the first to ascend to new financial heights within their immediate circles. For Marshawn, money equals power and is a universal language everyone speaks. He said:

People will be like, money can't buy you happiness and stuff. But I don't know? You need a certain amount of money in this world to live a lifestyle that you want to live. And just coming from middle school to high school, high school to college, I've seen that money actually matters, even though many people say it doesn't matter. Money is the language everybody speaks. So you got [to be] able to talk that language, think in that language, and then act on that language.

Financial stability is a driving force for many student participants who were often impacted by the high cost of tuition. Simply living a nice comfortable life was what pushed Zay toward the finish line. She shared:

I do want to have a nice house; I'm not gonna lie, I want to live nice. I want to not have to worry about where my next meal is coming from or anything like that. So that's

definitely a driving force, as well as wanting to live comfortably and continue to live comfortably.

The focus of this study was to illuminate and honor the cultural capital that students use in college. Arguably, financial capital can be deemed as the most important and valuable source of capital that contributes to success in this country. Though this study intentionally focused on cultural capital, participants all still lived in the United States, and to make it in this country, financial capital will likely be engaged. Understanding familial income, student loans, and socioeconomic status are all capitals students bring and continue to acquire during college.

Summary

All six sources of capital in Yosso's (2005) CCW framework were accessed and used by all 12 student participants in this study. All sources of capital were not mutually exclusive and often overlapped and built upon each other. Though all 12 participants shared they accessed all sources of capital, aspirational, familial, and navigational solicited the most narrative and storytelling. Family guidance, influence, and support were vital for all participants. This source of capital highlighted the importance of family and community for Black undergraduate students. There was a strong sense of cultural knowledge that students held fast to as they discussed the influence of family and community in their lives. I felt this interview component was often a tribute to the village that raised them. As mentioned previously, family ties are pivotal to Black student success, even if that family is not knowledgeable about the holistic collegiate experience—specifically, being Black at a PWI.

Expressed aspirations often extended past degree completion. There was a collective yearning to live a happy life and acquire enough financial stability to provide for themselves and their current and future family. Participation in NSBE was foundational in all 12 participants'

leadership, academic, and professional development. Watching their fellow chapter members face fears and succeed in professional spaces was a powerful source of aspirational, navigational, and social capital. All students had someone to thank within the organization. Due to their support, they felt a strong sense of responsibility to recruit new members into this coveted organization and support them along their journey through USD.

The need to garner the acceptance of White peers, faculty, and upper administration held a firm place in this study. Appeasing those institutional agents who hold a majority of the power at USD was a dance that all participants engaged in one way or another. A constant negotiation of identity can wreak havoc on one's internal sense of self. Questions around worth, value, and ability were addressed in one way or another by all participants, with some leaning into particular sources of capital more than others. Knowingly or unknowingly, adjusting behavior, speech, and language were used as a defense mechanism of protection against stereotypes and prejudices that will follow them for the rest of their lives. Choosing to seek inspiration from Black scholars, academics, musicians, and activists gave a voice to feelings many did not know how to articulate. The following chapter discusses the findings and highlights implications for practice and future research.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

The purpose of this dissertation was to explore the cultural capital that Black students relied on as they persisted at the University of San Diego (USD). Through this study, I also sought to identify what capital, if any, is fostered through involvement in the National Society of Black Engineers (NSBE) chapter at USD. The study was designed to deepen the understanding and application of Yosso's (2005) community cultural wealth (CCW) framework while also extending educational research on the Black student experiences at predominately White institutions (PWIs). The research questions were as follows:

1. How has Yosso's (2005) CCW theoretical framework been used by Black students involved in the NSBE chapter as they persist at USD?
2. In what ways, if any, does participation in NSBE increase or enhance CCW for Black students at USD?

Discussion of Findings

The discussion of findings is centered around the multiple ways with which students accessed and activated CCW during their time at USD. This discussion includes both the knowledge and skills they brought with them to college and what has been gained through their involvement in NSBE. The use of CCW provided a foundation for investigation and allowed student participants to use their voices and stories to define cultural capital from multiple perspectives, intersecting identities, and lived experiences. Since each source of capital, outlined in CCW, build upon each other and the sources of capital expressed by the student participants intersect in various ways, this section will highlight the three key learnings from the study. The three key findings included: 1) Power of Family, 2) Being Black "Enough,"

and 3) NSBE: A Needed Counter Space. This chapter will conclude with a section on recommendations for higher education practitioners and implications for further research.

Power of Family

Deficit-centered research has routinely blamed Black student underachievement on their families and communities and not on educational systems that were intentionally designed to create racial gaps (Fascging-Varner & Mitchell, 2013). These misconceptions can negatively program Black students to believe they are constantly at a deficit because their upbringing was “less” than their non-Black peers. University administrators and policymakers also often adhere to this dominant narrative, which dismisses historical, social, and moral discrimination against Black people in the United States. Black students come into college holding the unearned burden of being viewed as having low academic prowess as well as lacking “the social and cultural capital required for social mobility” (Yosso, 2005, p. 70). Black families are more often questioned for their parenting practices and approaches to childrearing than any other group, which leads to the assumption that individuals raised in these families are ill-equipped to navigate challenges in society (Cain & Combs-Orme, 2005; Yosso, 2005). This study offered an open space for student participants to share their individual stories about their upbringing and addressed how the concept of family is ever-evolving as they continue to define their academic journey.

For many Black Americans, familial capital comes in the form of communal bonds and pedagogies of the home that students later carry with them into the classroom (Yosso, 2005). Home, school, and community environments provided student participants with resiliency and support networks that informed all sources of cultural capital outlined in Yosso’s (2005) CCW framework. There is a common misconception that nontraditional family types (i.e., single

parent, multigenerational, legal guardians) within the Black community are associated with disadvantages for both parents and children (Cain & Orme, 2005). The findings suggested that being raised in a nontraditional home, in which participants experienced more economic hardship and independence at an early age, was beneficial to their ambition and drive to create a better life for themselves. There was often a cross-sharing of financial and childcare responsibility between the participants and their extended families, including grandparents, elder siblings, and friends' families. The community wealth gained from family was the key source of capital participants brought with them to college and was the genesis for all of them to seek out similar relationships on campus with their peers, faculty, and staff. Additionally, the responsibility they all have to the collective community health and wealth of their family lent itself to finding the chosen family they acquired through their NSBE chapter.

Aspirational capital within the context of the family allowed for parents and caretakers to see the possibilities for their children beyond their current environment. The familial commitment to ensure their child had access to opportunity through education gave many student participants a chance to attend private school away from their community and witness a lifestyle unlike their own. Participants' ability to see peers who had college funds, disposable income, and access to opportunities through social networks significantly impacted their future aspirations. This data point aligned with Yosso's (2005) definition of familial capital and the belief that if one is not born into a family whose knowledge is already deemed valuable, they could then access the knowledge of the middle and upper class and the potential for social mobility through formal schooling. It is also important to note that several students came from two-parent homes and had one or both parents, a grandparent, or siblings who attended college, which directly contributed to their confidence as engineering students.

All student participants arrived on campus with a set of communication skills and social tools that many of their peers did not possess, including cross-cultural awareness, a savvy vocabulary, and a maturity they often referenced when speaking about the ways they have integrated into campus life. They began acquiring this linguistic capital at a young, expressing the need to adjust the way they speak, act and sound to be deemed acceptable in society. Social capital showed up in the form of social education, which included being taught how to “grind,” “hustle,” and “secure the bag,” which all reference keeping your mind focused and eye on the prize. Many student participants discussed the connections they gained from the families of their friends, who they often stayed the night with or lived with to attend their private high school. Similarly, navigational capital had a direct connection to family, as every student participant met a moment where they felt as though they did not belong at USD and needed the support of friends and family from home to assert otherwise. Overcoming day-to-day adversity coupled with the strength to achieve despite it all is a transformative process and one that built resistance capital, which was acquired from the generational and ancestral knowledge passed down from family and community.

Though not mentioned explicitly in Yosso’s (2005) CCW framework, I argue that familial capital can also be attributed to the capital accrued from the knowledge of negative behavior and circumstances of family and the community in which one was raised. For several student participants, learning from the misfortunes and mistakes of others within their family and community contributed directly to their aspirations and drive to complete their degrees. The bedrock of resiliency within academia and the internal drive to power through and recover quickly from institutional constraints to flourish as engineers were attributed to their families and community upbringing.

Being Black “Enough”

As I wrapped up an interview with one of the student participants and thanked her for her time, she said to me, “When you asked me to be a part of your study I almost said no because I didn’t think I had anything to offer you as a Black student. I did not grow up in the struggle.” That blew me away and immediately made me think of what it means to be Black “enough.” This question found its home in this study in ways I never imagined. The choice to use a counterstorytelling data collection method was to give voice to Black students at USD and to highlight the reality that Black people are not monolithic. As much as there are similarities in the Black student experience, this study sought to highlight the diversity within racial groups that can be lost when students are primarily grouped by ethnicity within the system of higher education. It can be assumed that all Black students should be happy to frequent a multicultural office, participate in Black History Month festivities, or actively participate in activism and social justice initiatives. This identity consolidation, when unpacked, can offer higher education administrators’ insights into why it is important to acknowledge the diversity within the human experience.

Sweeping stereotypes of Black students in higher education are often connected to broader stereotypes of Black people in society. The Black community is often depicted as being dominated by low-income family structures, high rates of male joblessness, high incarceration rates, poor education systems, drug use, and gang affiliation. Yet, all the student participants in this study either were raised middle class or attended schools as part of a middle- to upper-class community. Children growing up in the suburbs can take on the culture of their immediate community, which can differ markedly from that of their urban brothers (Altman, 1995). Within these communities, education was often the priority, recreational activities were in abundance

(e.g., athletics, dance classes, music performances), and opportunities to expand knowledge beyond their K-12 institutions (e.g., study abroad, athletic trips, summer camps) were commonplace. Though there are clear benefits from the various positive experiences expressed by student participants, there were some adverse effects that came with this upbringing worth noting.

Code-switching was common practice and emerged in aspirational, navigational, social, and linguistic capital among student participants while simultaneously being the hardest to admit to or even recognize during the interviews. Student participants who attended PWIs for many years before college had encountered, in one way or another, the “speaking White” or “acting White” phenomenon. These are labels used to address individuals’ actions, most often those of Black students, who are acting in ways that have been deemed actions reserved for White people (Allen, 2014). This phenomenon can be harmful at its core, considering some student participants are simply products of their environment and speak as everyone in their community speaks. For other students in this study, who were raised in more racially diverse or majority Black communities, code-switching was more intentional. When asked how and when code-switching arose, they expressed the emotional and social intelligence needed to sway a perceived perception of them to secure what they needed. For one student participant, code-switching came down to an equation. He shared exactly how he disarms with pleasantries such as “yes, ma’am” and “no, sir” and smiles and laughs a lot at things he does not believe are funny. He then transitions to getting to know someone by speaking to them about what he believes they want to hear from a nice Black boy so they can feel charitable and give him what he needs.

Assimilation into majority Black spaces can also create grounds for code-switching. When asked about their relationship to the larger Black community, I was taken aback by how

many student participants said they do not necessarily feel accepted in other Black organizations and spaces explicitly created for Black students on campus. They presumed that to be accepted in both formal and informal Black spaces, they would have to code-switch to sound more “Black,” hiding the reality of their middle- to upper-class upbringing and show up to events they did not necessarily want to participate in but felt they needed to be welcomed again. With so few Black students on campus, there were references to cliques feeling like high school all over again. The desire to be accepted by other Black students who are not achievement-oriented or from their middle-class culture was sometimes fraught with identity confusion (Edwards, 2010).

Biculturalism can create an identity problem for middle-class Black people because some members desire allegiance to two mutually antagonistic cultures: middle-class culture, symbolic of White America, and their Afro-centric racial-ethnic heritage, which is sometimes in direct conflict with White middle-class values (Edwards, 2010). Involvement in NSBE is a safe space for all of them to be themselves. I found that the focus NSBE has on post-graduation success meant that they did not feel the need to qualify their Blackness as a part of their membership in the organization. All they needed was ambition and a will to be successful engineers. I believe participants’ involvement in NSBE allowed them to see—beyond their own sense of pride—how much their diverse perspectives are needed in today’s engineering workforce. This notion, in turn, makes being one of the few Black students in class and on campus an act of resistance in itself. Resisting feelings of exclusion through seeking out supportive communities affirmed their sense of belonging and supported the internal drive needed to finish their respective degrees. They all are Black “enough” in NSBE.

NSBE: A Needed Counter Space

Culturally based student groups and organizations are a cornerstone of engagement for students of color. Student chapters of Professional Engineering Organizations (PEOs) are mechanisms by which engineering students can become integrated both academically and socially (Smith et al., 2021). Tinto (1993) believed that unlike White students, whose social integration occurs primarily through informal association, students of color at PWIs are influenced by formal forms of association, such as involvement in student organizations. Though USD and the national NSBE chapter have guidelines surrounding what an outstanding student organization should be, the students identify what works best for their chapter. A sense of belonging can be a significant struggle and cause Black students in the STEM disciplines to feel invisible and hyper-visible simultaneously (cite). The individual member's leadership, academic ambitions, and responsibility for the chapter members' collective success as Black engineers make NSBE a powerful counter space within the engineering school.

Counter spaces are commonly referred to as safe spaces that counter discrimination and build a supportive campus climate for marginalized students. These spaces are culturally affirming or foster a sense of belonging within the larger exclusionary university (Garcia, 2016; Solarzano et al., 2010). Consistent with the definition and research on the value of counter spaces, involvement in USD NSBE provided student participants a space to access and consistently contribute to their individual and collective community cultural wealth. Social capital was illuminated most by student participants as the main benefit of participation in NSBE. Student participants had various stories of professional connections, networks, and opportunities they received by simply being an active member of the organization and attending hallmark events. Student participants who had been involved in NSBE longer displayed an

advanced ability to take advantage of the networks and human capital they had accrued over the years. These students had constant contact with me as their career coach and NSBE advisor, where I ingrained the importance of prompt follow-up with employers, formal introductions, and effective communication with those who interview them for an opportunity. As with ancestral knowledge, professional development knowledge is passed down within NSBE from generation to generation, so much so that senior NSBE leaders shared that they freely give resume reviews, assist peers in editing follow-up emails, and provide feedback on professional pitches.

Solórzano and Villalpando (1998) described academic counter spaces as spaces that allow Black students to participate in supportive, nurturing academic environments where they feel validated. As a refuge for student participants, counter spaces were also shown to be informal Black student study spaces, identity-based departments, and safe staff office spaces (cite). Administrators, staff, and faculty of color became part of some student participants' day-to-day check-ins, offering a familial support system on campus. Finding a sense of belonging with peer groups who shared similar educational, racial, and professional goals elevated the holistic impact of cultural capital. Some argue that race-focused counter spaces, like NSBE, can close students off from other mainstreamed groups and organizations. Student participants in this study all had social circles and involvement on a larger campus-scale, which contributed to building their navigational capital at USD. Many student participants had campus jobs, were engaged in undergraduate research, provided tutoring services, and participated in student organizations aligned with their interests. This mainstream level of student involvement expanded Black student representation on campus and countered the idea that minority-based counter spaces create barriers to larger campus involvement.

Recommendations for Higher Education Practitioners

This study initiated from an interest in the access and activation of cultural capital and how that contributes to the resiliency of Black students as they work toward degree attainment at USD. It was undeniably clear that family and community, both biological and chosen, were foundational to each student's successful navigation of their collegiate experience. Strong bonds with parents, siblings, grandparents, friends' families, and the NSBE community shaped students' career aspirations and academic drive. Higher education practitioners should view familial capital as an asset to the success of Black students and put systems in place to honor the power of that influence. Parent and family programming commonly ask for family members to travel to campus for a weekend and attend social events such as football games and BBQ cookouts. This programming could be reimaged to include opportunities for parents and families to experience a day in the life of their students to gain a better understanding of the experiences and challenges they encounter. This familial investment could foster more collaborative efforts between advisors, faculty, and families to ensure their student's concerns are addressed and a clear path toward degree completion is agreed upon by all parties involved. Similarly, programs like Student Support Services Summer Bridge program, whose purpose is to give first-year students transitioning into college a head start in adjusting to academic and campus life, can engage parents and families in the onboarding process and share the importance of encouraging their child to stay involved in SSS throughout their time at the university.

Counter spaces, both formal and informal, are imperative for Black students at a PWI. Optimistically, research has indicated that institutions and departments may enhance student persistence by offering formal and informal counter spaces (Ong et al., 2018). The NSBE student chapter can assist when an institution does not have a dedicated office or faculty/staff member

that oversees diversity retention efforts within an engineering school. The findings of this study draw significant attention to the importance of funding students to attend the NSBE national convention. This off-campus counter space is needed as a special place for students to gain all sources of cultural capital outlined in Yosso's (2005) theory. Success at the NSBE convention was not just based on employer connections and who got the most opportunities; it also included 4 days of freedom to be themselves and relate to their peers in ways that many did not know would be so valuable. They then brought this energy back to campus to empower each other to stay involved and expand the organization's visibility among administrators, faculty, and staff. High profile institutions that have financial resources can leverage costly interventions and programs that support retention efforts—but, for many schools, those programs do not exist (Ross & McGrade, 2016). Annual attendance creates a unique bond with fellow Black peers who have a shared goal of becoming professional engineers. With outstanding benefits academically, professionally, and personally, higher education practitioners should prioritize supporting fundraising efforts for NSBE members to attend the national convention. The output and labor students put forth to build the community and cultural capital needed to navigate campus and the future workforce far exceeds any financial cost to an institution to invest in this 4-day experience for students.

In addition to battling internal feelings, underrepresented students at selective schools can struggle with others' perception that they were admitted solely because of affirmative action preferences, even with academic qualifications on par with their peers from the dominant culture (Solórzano & Villalpando, 1998). Constant assimilation into dominant ways of learning, thinking, and speaking can be exhausting. Allowing space for Black students to speak and write in their voices through department newsletters and university wide blog posts could be a

powerful tool to acknowledge they are valued on campus. Higher education practitioners can work with their marketing and communications teams to uplift the accomplishments and voices of Black students beyond their department and academic unit. Campus acknowledgment through nominating students for awards, honoring their design projects, and offering gratitude for their time advocating for inclusive practices on campus could be an impactful way to show how much their presence is valued.

Implications for Further Research

The use of Yosso's (2005) CCW theoretical framework assisted in eliciting resource-rich narratives from student participants, but there is undoubtedly more to be explored. CCW views the individual as the accessor of capital but does not address the individual as a contributor. As participants ascended in their collegiate careers, many felt a responsibility to contribute to the success of their peers, family, and community. This responsibility was not a new concept for any community, where members benefit from active participation in the group but are expected to give back when they achieve greater knowledge than others in the group. This expectation could pressure Black engineering students who are already trying to adjust to a new landscape. An example of this could be a study exploring how often students utilize university designated identity spaces on campus such as multicultural centers and Black student resource centers. These spaces are typically formed and funded based on a deficit of inclusion for Black students on campus, yet many students in this study do not frequent these spaces because of not feeling Black "enough" to participate. Lack of participation in these spaces means they do not contribute cultural capital to the space that was built explicitly for them. Though this study was framed as an antideficit study, it could be beneficial to use the knowledge expressed from deficit research on Black engineering students and couple that knowledge with CCW to identify how students

both access and contribute to cultural capital. This lens could assist higher education practitioners in garnering a more holistic approach to support Black students in building a sense of belonging.

Prayer, faith, and spirituality are also an integral part of the Black experience, which is often not turned off just because they are in college. Their beliefs have shaped their whole life, including the relationship they have with the readings and teachings within their faith. This study was conducted when the Black community in the United States was plagued with the impact of the COVID-19 global pandemic and continued racial unrest, both of which had the power to lead to internalized trauma and pain among students (Baggish et al., 2020; Dryer et al., 2020). Often, the responsibility of supporting students in processing their feelings is placed on administrators and faculty of color. Higher education practitioners could provide additional mental health counseling and focus on spirituality and faith. This effort could require allocated financial resources to bring in outside professionals who are well-versed in this approach to counseling.

Considering what could be revealed if this study was conducted at historically Black colleges and universities (HBCUs) is also worth exploring. It can be assumed that NSBE chapters at HBCUs have more member attendance and participation. An exploration into the activation of cultural capital at an institution where the majority of faculty, peers, and staff are people of color could expand the research on what constitutes a counter space and if there is a need for them when the whole institution is built on the counter space concept of safety in community. Additionally, conducting this study during a school year with in-class instruction and an in-person national convention would be an ideal next step. I believe a study done in person after attending a NSBE convention would provide more insight into the impact and necessity of supporting NSBE efforts.

Limitations

Although this study provided thematic insights on NSBE students' expression of CCW, it was limited in its scope and application. This study was limited because it focused on one NSBE chapter from a singular institution. The results are context-centered and may not generalize to various institutional types or Black student populations. In turn, this study aimed to provide insight into the wealth of knowledge and contributions Black students can bring to a midsized, faith-based institution with low numbers of Black students compared to the larger population in an engineering school. Bias in the selection of participants was also a limitation of this study. Not all Black students in engineering are involved in NSBE, and though their experiences are as valuable, they were not included in this study. Lastly, there was only one researcher connected to this study. It could be argued that I hold a bias that could have impacted how I collected and analyzed the data. I believe the direct connection and established rapport with student participants added to the robustness and comfortability of student participants to share and trust that I would honor their authentic voice.

Conclusion

The culture established through NSBE's mission, and the interconnectedness created through its social events and national convention attendance lay the foundation for the bonding necessary for its members to achieve academically and subsequently remain in engineering (Daily et al., 2007). For the student participants in this study, the cultural capital that was accessed and activated to be successful as they worked towards degree completion was not solely based on attrition and retention. It was an accumulation of specific forms of knowledge, skills, and abilities that are valued within their community (Yosso, 2005). Students' stories and expressions of cultural knowledge, while valued within their family and among those who

contributed to their upbringing, may not be considered as valuable in the context of the university environment. This study sought to offer a unique perspective on who holds wealth on a college campus. Though enrollment numbers, retention rates, and grade point averages are vital to assessing student outcomes, I wanted to encourage a reimagining of what is deemed important to measure regarding ideal student outcomes, including cultural capital. By implementing some of the suggestions outlined in this chapter, higher education practitioners can collaboratively create a campus community that promotes growth, supports identity development, and encourages post-graduation success.

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APPENDIX A

Interview Protocol

Thank you again for your willingness to participate in this study. The goal of this study is to illuminate the resource-rich experiences of Black students involved in the National Society of Black Engineers (NSBE) and how, if at all, they access, activate, and foster cultural wealth as they navigate a Predominately White Institution (PWI).

Dr. Yosso's (2005) Community Cultural Wealth model examines six forms of cultural capital that students of color experience in college from an appreciative standpoint: aspirational, linguistic, familial, social, navigational, and resistance. Yosso's model explores the talents, strengths, and experiences that students of color bring with them to their college environment. As we engage in the interview, I will share what each of the forms of capital in Yosso's model is and then ask questions that align with that. Let's start!

General questions:

1. Please share your name, gender, major, and year in school.
 - a. Did you transfer to USD?
 - b. Are you the first in your family to go to college? First to pursue your major?
2. When did you join the USD NSBE chapter? What compelled you to join?
3. Did you have/do you hold a current position in the NSBE chapter?
 - a. Share the positions you have held?
 - b. Have you attended the National Conference? Regional?
4. Outside of NSBE, what other student organizations or groups have you been/are you involved in?

Familial Capital: cultural knowledge nurtured among family that carry a sense of community, history, and cultural intuition; expands the concept of family to include kinship.

1. Let's go back in time a little bit. How did your family and community help shape your educational pursuits?
2. In what ways did your upbringing support your commitment to your education?
 - a. Are there any values or beliefs instilled in you as a kid that you use(d) as an undergraduate student?
3. How does the concept of "family" show up for you at USD? Please share an example of this.

Aspirational Capital: ability to maintain hopes and dreams for the future despite real and perceived barriers.

1. What contributed to your decision in picking your major?
 - a. What has encouraged you to stay committed to your goals? Anything distract you from these goals?
2. Has involvement in NSBE or enhanced your perception of being a Black engineer?
 - a. other cultural organizations
3. Once your aspirations are/were developed, who and what contributed to reaching your goals?

Social Capital: can be understood as networks of people and community resources.

1. What peer interactions would you deem most valuable to your success as a student?
2. Please describe the most significant peer relationship you have developed thus far that has enhanced your college experience.

- a. What about non-engineering-related relationships?
3. Have you been connected to an opportunity that was directly or indirectly through your involvement in NSBE? If so, what was it?

Linguistic Capital: Includes intellectual and social skills learned through communication experience in more than one language and/ or style.

1. What do you think impacts the language you use? Does it shift based on whom you are speaking to? If so, can you share an example?
 - a. Are/Were you able to communicate in class or outside of class without feeling as though you lost your identity?
2. Now that you have spent some time in college and within your major, what advice and support would you offer a high school-aged black student on how to best adjust to being an engineering student at USD?

Navigational Capital: refers to skills of maneuvering through social institutions.

1. The NSBE mission is “to increase the number of culturally responsible Black Engineers who excel academically, succeed professionally, and positively impact the community.” How does the NSBE mission positively align with your values?
2. In what ways, if any, have student involvement, conference attendance, networking opportunities, and campus resources empowered you to achieve in class and at USD?

Resistance Capital: knowledge and skills fostered through oppositional behavior that challenges inequality.

1. The engineering school has a small number of Black students, and, I imagine, you are often the only Black student in your major courses. What messages have you received about your identity as a Black student at USD? How have you overcome them?

2. What drives your success when you are faced with academic challenges?
3. How have you challenged these messages, or are you not interested in doing so?
 - a. How do your peers react when they hear you are in NSBE? Get to go to attend conferences? Connections to opportunities?

Final question: Reflecting on the questions we have already discussed, is there anything you would add to the assets you have used to enhance your experience as a Black student at USD?

Apr 22, 2021 9:32:59 AM PDT

Rhonda Harley
Sch of Leadership & Ed Science



Re: Expedited - Initial - **IRB-2021-306**

BLACK BEYOND MEASURE: An Anti-Deficit Exploration of Cultural Wealth
within a National Society of Black Engineers (NSBE) chapter at the University of San Diego

Dear Rhonda Harley:

The Institutional Review Board has rendered the decision below for IRB-2021-306, BLACK BEYOND MEASURE: An Anti-Deficit Exploration of Cultural Wealth within a National Society of Black Engineers (NSBE) chapter at the University of San Diego.

Decision: Approved

Selected Category: 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Findings:

Research Notes:

Internal Notes:

The USD IRB requires annual renewal of all active studies reviewed and approved by the IRB. Please submit an application for renewal prior to the annual anniversary date of initial study approval. If an application for renewal is not received, the study will be administratively closed.

Note: We send IRB correspondence regarding student research to the faculty advisor, who bears the ultimate responsibility for the conduct of the research. We request that the faculty advisor share this correspondence with the student researcher.

The next deadline for submitting project proposals to the Provost's Office for full review is N/A. You may submit a project proposal for expedited or exempt review at any time.

Sincerely,

Eileen K. Fry-Bowers, PhD, JD
Administrator, Institutional Review Board
Office of the Vice President and Provost
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