McNair Scholars' Science, Technology, Engineering, and Mathematics (STEM) Graduate Experience: A Pilot Study

Senetta F. Bancroft
Southern Illinois University-Carbondale

Susan Kushner Benson
University of Akron

Eugenia Johnson-Whitt
Walsh University

Nationally, racial and gender disparities persist in science, technology, engineering, and mathematics (STEM) disciplines. These disparities are most notable at the doctoral level and are also found in the doctoral outcomes of Ronald E. McNair Postbaccalaureate Achievement Program participants (Scholars) despite opportunities designed to promote their doctoral success. Scholars from three McNair Programs were surveyed. The survey included items related to Scholars' perceptions of their McNair Program experiences, graduate advisor relationship, and experiences with stereotype threat. Scholars overwhelmingly reported their McNair Program experiences as beneficial to their STEM graduate studies and their graduate research advisors as supportive. However, Black female Scholars also overwhelmingly reported experiences related to stereotype threat. Improvements for survey items and the need for STEM education research to explicitly link educational experiences with institutional oppressions such as racism and sexism are discussed.

Students from Black, Latina/o, and Native American communities have disproportionately low representation in science, technology, engineering, and mathematics (STEM) fields at all levels of higher education compared to their representation in the general U.S. population (National Science Foundation [NSF] & National Center for Science and Engineering Statistics [NCSES], 2015). Consequently, they are collectively classified as underrepresented minorities (URMs) in STEM. Racial disparities in STEM higher education are most acute at the doctoral level. For example, despite representing about a third of the U.S. population, in science and engineering URM students earned just 18.9% of undergraduate degrees, 13.7% of master's degrees, and 7.3% of doctoral degrees awarded in 2012 (NSF & NCSES, 2015; U.S. Census Bureau, 2010). URM students continue to slowly and steadily earn a larger percentage of undergraduate and master's degrees. Despite this steady growth, the proportion of URM students earning science and engineering doctorates has remained at approximately 7% for more than a decade (NSF & NCSES, 2015). The proportion of URM students earning mathematics doctorates between 2000 and 2010 was flat at 4% (NSF & NCSES, 2013).

Given the projected growth of racial minorities to more than half of the general U.S. population by 2050 (U.S. Census Bureau, 2010), an increasing difficulty in importing STEM talent from other countries (Freeman, 2006), and the important innovations individuals with STEM doctorates contribute to an increasingly knowledge- and innovation-based U.S. economy

(Leggon, 2010), several recent U.S. government reports have focused on increasing racial diversity in STEM higher education (Augustine, 2005; Committee on Challenges in Chemistry Graduate Education et al., 2012; National Academy of Sciences, 2011; Committee on Prospering in the Global Economy of the 21st Century et al., 2007). Overwhelmingly, strategies promoted in these reports advocate providing individual URM students with greater access to research opportunities, financial support, and mentorship at the undergraduate level and increased financial support through fellowships at the doctoral level. Undergraduate research opportunities and mentorship help URMs develop their scientific knowledge and identity and are valuable in the STEM doctoral journey (Eagan & Newman, 2010). These strategies have been used for decades (see for example McCoy, Wilkinson, & Jackson, 2008; National Institutes of Health, n.d.). Although these strategies seem to be slowly contributing to racial diversity, particularly at the undergraduate level, their impact on racially diversifying who ultimately goes on to earn STEM doctorates has been limited.

Critical explorations of educational institutions reveal race-based barriers influence how URM students experience their doctoral environment (Gildersleeve, Croom, & Vasquez, 2011; Lewis, 2003). Race-based barriers in U.S. educational institutions have a strong link to the nation's laws and policies (Bell, 1995). For example, although the *Brown v. Board of Education* (1954) decision desegregated U.S. schools, it did not address the *de facto* racial segregation in housing, school funding, and economic opportunity that was and continues to be widespread in both southern and northern states (Frankenberg, Lee, & Orfield, 2003; Patterson, 2001). Further, equitable educational opportunities that were achieved after *Brown* were undermined as the U.S. House of Representatives and the U.S. Supreme Court both cast as questionable the social science research used to support the benefits of school desegregation (Chapman, 2006). Often when Black and Latino individuals attempt to be involved in shaping school policies or culture they are essentially excluded because their knowledge and cultures are not recognized or valued in predominantly White schools (Villenas & Dehle, 1999). Given this history, it is perhaps not too surprising that decades of federally funded strategies to increase doctoral completion rates in STEM, aimed mostly at individuals, present few critiques of STEM community sociocultural values and norms in relation to race (Bancroft, 2013). When strategies focus on addressing retention at the individual level, responsibility for attrition is removed from universities, departments, and faculty (Golde, 1998). Additionally, the racial disparities in STEM do not occur in environments insulated from the racial inequities in wider U.S. society (Fox, 1999). Therefore, a continued focus on individuals has distracted from a systemic view of the problem and a systemic view of URM students in STEM must include sociocultural perspectives on race in the general U.S. society.

With a systemic view in mind, the purpose of this study was to capture one snapshot of the complex system URM students are likely to navigate in their pursuit of a graduate STEM degree. This snapshot was captured through a critical review of the literature related to doctoral experiences in general, URM students and education, and STEM doctoral experiences, as well as a researcher-created survey of the sociocultural experiences of an underrepresented student population receiving federally funded opportunities to increase their doctoral success.

Literature Review

Socialization and STEM Graduate Success

Socialization is the process by which humans acquire the skills necessary to learn the norms of the cultures they inhabit and perform as functioning members of the society of that culture (Macionis & Gerber, 2011). Socialization is fundamental to a successful STEM graduate outcome (Sweitzer, 2009). STEM institutions worldwide have adopted the *Liebig method* to train graduate students (Rocke, 2003). The Liebig method uses an apprenticeship model to inculcate students into the culture and enhance the skills necessary for progression in their chosen field (Elliott, Stewart, & Lagowski, 2008). Although part of the apprenticeship involves mastering research skills (Committee on Challenges in Chemistry Graduate Education et al., 2012), a significant aspect involves helping students acquire the often tacit skills (such as preferred ways of speaking and dressing) necessary to exhibit behavioral standards and norms expected of those more advanced in their field (Weick & Quinn, 1999). Successful socialization is necessary for graduate students to form productive relationships within research groups and with their research advisors (Mendoza, 2007). However, socialization theories often used to frame the problem of URM students' low participation in the doctorate, such as Tinto's (1993) internationalist theory and Bandura's (1977) social learning theory, do not account for the unwelcoming atmosphere these students are likely to face in primarily White institutions (Pascarella & Terenzini, 2005). Further, socialization theories on their own cannot account for the role racism plays in the URM STEM doctoral journey (Barker, 2011). Racial identity is one of the definitive categories used to identify who is appropriately represented, overrepresented, and underrepresented in STEM. Racial identity also defines who holds political and economic power in the U.S. (Delgado & Stefancic, 2012). Thus, this study sought to explore Black, Latina/o, and Native American students' persistent underrepresentation and sociocultural experiences in STEM at the graduate level through a critical lens.

Sociocultural Barriers and STEM Graduate Success

Racism. Critical research about racism confronts the injustice of a particular society and is an explicitly transformative and political effort (Kincheloe & McLaren, 2000). As a critical endeavor, this study sought to understand STEM graduate program culture as well as critique and offer suggestions for changing it. To confront persistent racial disparities in STEM on a systemic level through a critical lens, it is useful to take a moment to conceptualize how racism manifests in U.S. society.

Racism, according to Higginbotham (1983, as cited in Mohanty, 2003), legitimizes the exclusion of non-Whites from particular areas of social and economic life while promoting a tolerance among Whites for these inequities. Hooks (1995) clarifies the personal and systemic ramifications of racism, where:

> Racism is oppressive not because white folks have prejudicial feelings about blacks (they could have such feelings and leave us alone) but because it is a system that promotes domination and subjugation… The prejudicial feelings some blacks may express about

> whites are in no way linked to a system of domination that affords us any power to coercively control the lives and well-being of white folks. (p. 154-155)

Hook's (1995) signaling of racism as a form of oppression in the excerpt above invites us to conceptualize an even broader view of what racism is, why it is enacted, and its consequences for those who perpetuate it and those who experience it. Oppression is a process that "involves institutionalized collective and individual modes of behavior through which one group attempts to dominate and control another in order to secure political, economic, and/or social-psychological advantage'' (Mar'i, 1988, p. 6). Additional forms of oppression used by dominant groups to secure their advantage in STEM include classism, sexism, heterosexism, and ethnic prejudice (Harding, 2008).

Racism, although mostly transformed from overt to subtle acts of violence such as negative stereotyping, is ever present in U.S. society (Delgado & Stefancic, 2012). The tolerance Whites continue to have towards systemic inequity is predominantly justified and perpetuated by strongly held negative stereotypes of individuals who are racial minorities (Hunt, 2007). Half to three quarters of White individuals in the U.S. express negative stereotypes of Black and Latina/o individuals (Hunt, 2007). These include perceptions of Blacks, Latinas/os, and Native Americans as lacking motivation to work hard (i.e., they are perceived as lazy) and as less intelligent than White individuals (Bobo & Charles, 2009; Steele & Aronson, 1995). That is, White individuals often blame racial minorities for the disparities that exist in education, the workforce, and elsewhere because of presumed sociocultural or even genetic deficiencies (Hill, 2008). This blame renders invisible to many how U.S. laws and policies collectively produced and still reproduce the preservation of political, economic, and/or social-psychological advantages for White individuals (Bell, 1995; Hill, 2008). Thus, U.S. race-based negative stereotyping and its consequences are inseparable from racism and oppression that has been reinforced by policy and law.

Sexism. A second sociocultural barrier consistently reported in STEM doctoral culture is sexism. Sexism is "any discrimination against women or men because of their sex, and made on irrelevant grounds" (Graddol & Swann, 1989, p. 96). At this point, it is worthwhile to take a moment to conceptualize the difference between sex and gender. The term sex is well used and more appropriate in biological models used to explore differences between men and women (Unger, 1979). In contrast, the term gender is more concerned with sociocultural factors that contribute to differences between sexes (Unger, 1979). Since Unger's (1979) work, the term gender is more widely used (Haig, 2004) where younger individuals view the use of sex as outdated term for gender (Capdevila, 2007). In keeping with the sociocultural nature of this study the term gender rather than sex is used unless the sources referenced used the term sex.

Mostly, gender discrimination favors men. Gender differences, like race-based differences, have remained persistent in STEM graduate outcomes. For White individuals, women earn a lower proportion of STEM graduate degrees than men do at all degree levels (NSF & NCSES, 2015). For URM students, women earn a higher proportion of STEM graduate degrees than URM men do at all degree levels (NSF & NCSES, 2015). However, sexism is a pervasive tool of oppression used in STEM institutions as a basis for exclusion of women of all identities (Harding, 2008). As with racism, one of the consequences of sexism in academic and professional environments can

be negative stereotyping and stereotype threat (Logel et al., 2009; Steele, 1997; Steele & Aronson, 1995). Thus, URM women in STEM often deal with the intersecting oppressions of racism and sexism (Ong, Wright, Espinosa, & Orfield, 2011).

Stereotype threat. Feelings of being judged based on race and/or gender are typically associated with negative stereotypes (Steele, 1997). Perceptions of being negatively stereotyped often result in *stereotype threat*, where individuals feel "at risk of confirming, as self-characteristic, a negative stereotype about one's group" (Steele & Aronson, 1995, p. 797). Stereotype threat encompasses the social and psychological influences an individual experiences when anything they do or any feature they possess is framed as conforming to the negative stereotypes associated with their group, and makes these stereotypes more plausible to others, and even to the individual (Blackwell, Snyder, & Mavriplis, 2009). Under stereotype threat URM students not only perform worse on academic tests, but also feel the need to work harder than their peers in an attempt to avoid conforming to or confirming negative stereotypes (Aronson, Fried, & Good, 2002; Bancroft, 2014; Blackwell et al., 2009). The novice graduate students' interactions with faculty and older students provide them with insights into professional ideology, motives, and attitudes (Weidman et al., 2001). However, if these interactions include negative stereotyping it is understandable that these perceptions affect URMs' sense of acceptance and desire to persist in STEM research and academic communities.

Ronald E. McNair Postbaccalaureate Achievement Program and URM Doctoral Outcomes

Ronald E. McNair Postbaccalaureate Achievement Programs are federally funded through the U.S. Department of Education (USDE) and its participants' (Scholars) experiences can provide a unique opportunity to explore a large racially and ethnically diverse population of students who have comparable academic achievement, goals, and preparation for the doctorate. The McNair Program recruits more than 1,400 students per year from over 200 U.S. and Puerto Rican institutions of higher education (USDE, n.d.). It was specifically designed to provide academically promising students who are traditionally underrepresented in higher education and/or low income and first generation students with targeted preparation for the doctorate (USDE, n.d.). With the aim of increasing diversity, the program goals include supporting McNair Scholars (typically starting in their junior year) through the doctoral application process; creating opportunities for them to conduct research at the undergraduate level and engage with faculty in an academic setting; securing financial support for pursuing a doctoral degree; and exposing them to other academic and cultural events typically unavailable to URM and/or disadvantaged students (USDE, n.d.). These other academic and cultural events, for example, can provide Scholars with workshops on writing curriculum vitae and graduate essays; preparing for the general GRE test, a graduate school admission test widely required by U.S. graduate institutions (Educational Testing Services, 2015); coaching on effective public speaking strategies; and travel to present their research at national conferences. Therefore, McNair Programs use strategies oriented towards changing individual URM student outcomes and are typical of those advocated for in the national reports cited in the introduction.

The most recent longitudinal study analyzing data from participants enrolled in McNair Programs from inception in 1989 to 2000, reported a 6% doctoral degree completion rate for Scholars (McCoy et al., 2008). Further data disaggregation revealed race as a dominant indicator

of which Scholars ultimately earned doctoral degrees. White Scholars, representing 19% of all Scholars, earned 42.5% of the doctoral degrees earned since the program's inception. Black and Latinas/o Scholars, representing 69% of all Scholars, earned 46.4% of doctoral degrees among Scholars (McCoy et al., 2008). White students' overrepresentation, despite their being low income and/or first generation, may be indicative of the influence racism in doctoral environments plays on the doctoral outcomes of Scholars. Further, male Scholars, who are also a minority of Scholars in terms of absolute numbers, were twice as likely to earn a doctorate compared to female Scholars (McCoy et al., 2008). This replication of the relationship between race and gender and disparities in STEM doctoral success, despite specific strategies to reduce these disparities, makes understanding and critiquing the experiences of McNair Scholars in STEM graduate programs a potentially useful and important approach to addressing URM students' lower completion and higher attrition rates in STEM doctorates (Council of Graduate Schools, 2009).

Research Purpose and Questions

The purpose of this study was to explore McNair Scholars' perceptions of their McNair Program experiences, their perceptions of their doctoral program experiences, and their perception of the role of race and gender in their STEM graduate experiences. The research questions framing this study were:

1. What are STEM Scholars' perceptions of their McNair Program experiences?
2. Based on gender, how do Scholars differ in their perceptions of the academic, social, and cultural interactions they experience in a STEM graduate degree program?
3. Based on race, how do Scholars differ in their perceptions of the academic, social, and cultural interactions they experience in a STEM graduate degree program?

Methods

Participant Selection

Participants in this study were former McNair Scholars who were either actively or formerly enrolled in a STEM master's or doctoral program and all received the standard McNair Program opportunities described in the literature review. As undergraduates, the participants were McNair scholars who had participated in one of three McNair Programs housed in Ohio universities. Although our primary focus was the doctoral experiences of URM students in STEM, the decision to include McNair Scholars who were currently or formerly enrolled in master's as well as doctoral programs was made for three reasons. First, 39.7% of McNair participants go on to earn master's degrees rather than doctoral degrees (McCoy, et al., 2008). Second, formative evaluation data collected during the instrument development process indicated that master's level URM Scholars shared experiences similar to those of URM doctoral students. Third, although there is no clear data, "mastering out" (students are allowed to exit a doctoral program with a master's degree if they meet certain requirements) and programs requiring students earn a master's degree prior to entrance to a doctoral degree are common practices in doctoral programs.

Instrument

A researcher-created questionnaire, the *Survey of Graduate Experiences of McNair Scholars* (SGEMS), was developed. Literature related to the doctoral experience, URMs' experiences in U.S. education institutions, and gendered doctoral experience was used to write an initial 30-item questionnaire and to demonstrate initial evidence of content validity. The questions aligned with academic preparation, social support, race-based barriers, and gender-based barriers. Responses were along a 4-point Likert scale from "Strongly Disagree" to "Strongly Agree." The SGEMS was then subjected to a three step formative evaluation (Dick, Carey, & Carey, 2014).
First, to further establish evidence of content validity a content expert reviewed the initial 30 items. The expert was a director of a McNair Program that placed an emphasis on recruiting Scholars interested in pursuing STEM doctorates. She is an underrepresented woman of color who holds a doctorate and is a university lecturer on issues related to underrepresented people of color. She clarified the goals of the McNair Program. She also identified wording that would potentially confuse participants. For example, she identified the need to disaggregate Scholars' feelings about how their peers and professors perceived them into academic and personal categories. This expert review resulted in 10 items being added to the questionnaire. Next, the revised 40-item questionnaire was reviewed by an expert in psychometrics and survey research who evaluated clarity of wording, item formatting, and overall layout. To simplify the layout, related items were collapsed into multi-part items. Although the restructured questionnaire contained 22 individual items, it preserved the content of the 40-item questionnaire. Finally, three pseudo-participants who represented the demographics of the likely participants (e.g., gender, race, and program level) reviewed the questionnaire. All three were Scholars who were currently enrolled in a graduate program. The questionnaire was refined after each interview. The first pseudo-participant interviewed was a Black female who was a first-year doctoral student in medicinal chemistry at a Southern university. The second pseudo-participant was an East Indian male who was a first-year doctoral student in materials science research at a Midwestern university. The third pseudo-participant was a Black female who was a third-year master's student in a psychology program at a Midwestern university.

While viewing the questionnaire, each pseudo-participant was asked questions about the face validity of the questionnaire and the clarity and appropriateness of each item. Scholars were interviewed separately and one or two days apart. The questionnaire was refined for clarity after each interview. All three pseudo-participants found all items to be appropriate. However, each made suggestions about changing the wording of items to increase clarity. In addition to refining the clarity, one item was added to allow Scholars to share their views on preparation they did not receive from their McNair Program, but which they felt would have been helpful in their graduate program. Two final versions were developed, each consisting of 23 items. The first version of the questionnaire was worded grammatically for Scholars who were currently enrolled in a graduate program and the second was worded grammatically for Scholars who were previously enrolled in a graduate program. Both questionnaires were transferred into Qualtrics (Qualtrics LLC, 2013), an online survey tool (see Appendix for SGEMS questionnaire).

Data Collection

The first author contacted the program directors of the three Ohio universities. The purpose of the research study was discussed. Subsequently, an information letter and a link to the online questionnaire were disseminated by program directors to all McNair Scholars in their database by email. Three weeks later the program directors were asked to re-send the information letter and the links for each questionnaire a second and final time. Questionnaires were sent to 84 scholars. Twenty-five responses were received, representing a 30% response rate. A 30% response rate is very close to the response rate for shorter online surveys of 31.4% reported by Duetskens, Ruyter, Wetzels, & Oosterveld (2004). Of the 25 responses, 14 identified their current area of study as a STEM graduate program and they comprised the sample population. Participants pursued graduate degrees in chemistry (n = 2), life sciences (n = 6), psychology (n = 1), physiology (n = 1), engineering (n = 1), and mathematics (n = 3). The demographic characteristics of the participants compared to national data are displayed in Table 1.

Table 1
Scholars' Characteristics as a Percentage of Sample n = 14 (National Data in Parentheses)

Characteristic	Percent
Gender	
Male	28.5 (33.4)
Female	71.4 (66.4)
Race/Ethnicity	
Black	64.3 (43.8)
Asian	7.1 (5.7)
White	21.4 (19.1)
Mixed/Other	7.1 (0.7)
Graduate Level	
Doctoral	71.4
Master's	21.4
No response	7.1
Possess a Master's	
Yes	42.8
No	50.0
No Response	7.1
Years in Most Recent Graduate Program	
0-1	42.8
2-4	50.0
5-7	7.1

Note. National data adapted from McCoy, A., Wilkinson, A., & Jackson, R. (2008). *Education and employment outcomes of the Ronald E. McNair Postbaccalaureate Achievement Program alumni.* Washington, D.C.: U.S. Department of Education Office of Planning, Evaluation and Policy Development Policy and Program Studies Service.

As shown in Table 1, the gender of sample participants was representative of the targeted population of McNair Program participants. With respect to race, although White and Asian Scholars' participation in this study was representative of the targeted population, Black McNair Scholars were overrepresented. Further, Latina/o and Native American Scholars who collectively

comprise of 30.5% of the national McNair Scholars' population were not represented in this study. More specifically, this study included eight Black females, one Asian female, one White female, two Black males, one White male, and one male who did not indicate his race/ethnicity.

Data Analysis

The SGEMS included items addressing influences beyond STEM graduate program experiences, such as family support and participants' motivation for pursuing a graduate degree. However, framed by the research questions, the data analysis specifically focused on items addressing students' perceptions of their McNair Program experiences and their perceptions of the sociocultural environment of their STEM graduate degree program in relation to race and gender. Within Qualtrics (Qualtrics LLC, 2013), filters were used to remove participants who did not meet the criteria for participation in the study. The descriptive statistical reports summarizing responses of participants who met the study's criteria were exported into Microsoft Excel. Within Excel, responses of "Strongly Disagree" and "Disagree" were collapsed into one category of "Disagree." Similarly responses of "Strongly Agree" and "Agree" were collapsed into one category of "Agree." To explore trends in responses based on race and gender, a second analysis was done in Qualtrics cross-tabulating participants' responses with their self-reported race and gender.

Frequencies in relation to participants' race and gender are reported. The relatively small number of participants in some categories (for example the category of male) resulted in large percentage representations although the absolute number of participants those percentages represent were low. For example, the addition or removal of one participant to a male category shifts the percent representation by 25%.

Results

Perceptions of Program Support

A large percentage of participating McNair Scholars reported their McNair Program experiences prepared them for varying aspects of graduate study. All but one Scholar (male, no race indicated) perceived participation in the McNair Program as influential to gaining entrance into graduate school. All Scholars felt their McNair Program prepared them for graduate level research. 85.7% of Scholars (all 4 males, 7 Black females, 1 White female) felt that the program prepared them for formal social interactions with peers and faculty. Just over three-quarters (78.6%) of the participants (2 Black males, 1 male no race indicated, 7 Black females, 1 White female) reported that the program prepared them for informal social interactions such as party gatherings. Likewise, 78.6% (1 Black male, 1 White male, 1 male no race indicated, 7 Black females, 1 White female) reported that the program was an important factor in securing financial support for graduate studies.

A large majority, 92.9% of Scholars (all 4 males, 7 Black females, 1 White female, 1 Asian female), perceived their advisor as academically supportive. A smaller majority, 57.1%, also reported that their advisors provided emotional support (1 White male, 1 male no race indicated, 5 Black females, 1 White female) or understood the challenges they faced as a low-income, first

generation, and/or an underrepresented minority in a graduate program (1 Black male, 1 White male, 1 male no race indicated, 4 Black females, 1 Asian female).

Perceptions of Impact of Gender on Academic Experience

Overall, Scholars reported varying degrees of a belief that gender had impacted their academic experiences. A total of 21.4% (1 Black male, 2 Black females) of participating McNair Scholars perceived that professors made academic judgments based on their gender and 28.6% (1 Black male, 2 Black females, 1 Asian female) felt that professors made personal judgments about them based on their gender. Similarly, 28.6% of participating McNair Scholars felt their peers made significant academic or personal judgments about them based on gender. Despite this overall perception of an absence of gender-based judgment from faculty and peers, 50% (1 Black male, 1 White male, 1 male no race indicated, 4 Black females) still indicated feeling a heightened awareness of being representative of their gender. Despite this eclectic mix of Scholars indicating a heightened awareness of being representative of the gender, only females (3 Black, 1 White, 1 Asian) indicated that they needed to work harder because of their gender. This heightened awareness of one's gender and feeling a compulsion to work harder than others because of gender are examples of experiences associated with stereotype threat.

Perceptions of Impact of Race on Academic Experience

In contrast to their academic experiences related to gender, Scholars reported a greater impact based on race. When asked about the role of race in their graduate experiences 50% of participating McNair Scholars felt that their advisors made academic (2 Black males, 4 Black females, 1 White female) or personal judgments (2 Black males, 4 Black females, 1 Asian female) about them based on race. Nearly a third (60%) of participating McNair Scholars (2 Black males, 6 Black females, 1 Asian female) felt that their peers judged them academically and 50% (2 Black males, 4 Black females, 1 Asian female) felt their peers made personal judgments about them based on race. Additionally, 64.3% (2 Black males, 7 Black females) of participating McNair Scholars had a heightened awareness of representing every one of their race. A total of 57.1% (2 Black males, 5 Black females, 1 Asian female) felt they had to work harder than their peers because of their race.

Table 2
Summary of Scholars' Perceptions of the Role of Gender and Race in their Graduate Academic Experiences by Gender and as a Frequency and Percentage of Sample N= 14.

	Heightened Gender Awareness		Must Work Harder than Peers due to Gender		Heightened Race Awareness		Must Work Harder than Peers due to Race	
Gender	f	%	f	%	f	%	f	%
Male (*n* =4)	3	21.4 [a]	0	0	2[b]	14.3	2[b]	14.3
Female (*n*=10)	4	28.6[b]	5[c]	35.7	7[b]	50.0	6[e]	42.9

[a]1 identified as Black, 1 identified as White, 1 no race indicated. [b]All identified as Black.
[c]3 Black, 1 White, 1 Asian. [e]5 Black, 1 Asian.

The data were cross-tabulated to explore how race and gender intersected for the 14 participating McNair Scholars in Table 2.

Three males of at least two different racial identities indicated feeling heightened awareness of their gender; none felt a need to work harder than their peers because of their gender. Females of varying racial identities felt a need to work harder than their peers because of their gender. Therefore, although both males and females may feel heightened gender awareness, females in this study were more likely to also feel compelled to work harder because of their gender.

In contrast, the two males who reported a heightened awareness of their race also reported a sense of needing to work harder because of their race. Of the seven females (all of whom were Black) who reported heightened race awareness, five reported a compulsion to work harder than their peers because of their race.

Discussion

This study sought to capture a snapshot of the culture URM students encounter within STEM graduate degree programs. Although the small sample of Scholars surveyed limits the generalizability of the study's findings, Scholars' reported perceptions provide insight into some challenges URM students face that opportunities such as research experiences and financial support cannot mitigate.

Consistent with the assertion that gender could provoke negative stereotypes and subsequently cue stereotype threat, the findings of this study found that women are more likely to have heightened gender awareness and exclusively feel compelled to work harder because of their gender. Furthermore, despite White and Asian female Scholars' reported experiences associated with stereotype threat, only Black female Scholars indicated a combination of heightened gender and race awareness and a compulsion to work harder because of gender and race. These findings reflect previous studies that found Black females in particular experience the double oppression of racism and sexism (Ong et al., 2011).

The variability in the race of males who indicated heightened gender awareness was unexpected. This finding is even more unexpected when closer inspection reveals these three males were in two of the most male dominated STEM fields: mathematics and engineering (NSF & NCSES, 2015). Black males have the worst indicators for health, education, employment, income, and overall well-being of all groups in the U.S. (Noguera, 2008). So, it is perhaps less puzzling that a Black male might feel some heightened gender awareness even in a male-dominated STEM field. It remains unclear why a White male mathematics doctoral student would feel heightened gender awareness. Despite this discrepancy, it is plausible that being in a male-dominated STEM field mitigates heightened gender awareness if it is felt and thus accounts for the absence of any participating males feeling the compulsion to work harder.

Only Black Scholars, male and female, reported both heightened race awareness and a compulsion to work harder because of their race. Therefore, within this study Black Scholars were most likely to have feelings associated with race-based stereotype threat (and therefore experiences with racism). This finding is consistent with Bobo and Charles' (2009) work that

Black individuals in the U.S. tend to experience the highest degree of negative stereotyping and the extrapolation from Fox's (1999) work that this stereotyping would be reflected in URMs' STEM experience. However, there seemed to be no obvious link between Scholars' reported experiences with race-based negative stereotyping and their perceptions of their advisor relationship.

Advisors who develop close, positive relationships with their students are more likely to consistently advocate on behalf of these students (Barnes & Austin, 2009). Students who have perceptions of positive advisor relationships also report more positive views of their discipline and shorter time to degree (Zhao, Golde, & McCormick, 2007). Therefore, the advisor relationship is crucial to graduate success (Paglis, Green, & Bauer, 2006). Moreover, Black students' motivation to work harder has been linked to interactions with faculty that they view negatively (Lundberg & Schreiner, 2004). Conversely, White students tend to have the best perceptions of faculty and rarely feel the compulsion to work harder after interactions with faculty (Lundberg & Schreiner, 2004). Therefore, it was not expected that the participants who were most likely to experience two different sources of stereotype threat, i.e., Black female Scholars, would predominantly view their advisors as academically and emotionally supportive as well as understanding the challenges they face as disadvantaged students. It is likely the survey items were limited by not exploring Scholars' sense of academic and emotional support by faculty other than their advisor and peers. With a majority of URM participants reporting feelings of being judged by faculty and peers in comparison to their more positive perceptions of their advisors, it is possible that interactions with faculty (other than the advisor) and peers play a notable role in URMs exposure to negative stereotyping and thus stereotype threat. This is a reasonable possibility since peer and other faculty interactions are more likely to occur on a daily basis in comparison to interactions with their advisors.

In addition, an unexpected finding was that the Asian female Scholar in this study reported similar perceptions as Black female Scholars. Although data on the specific geographic background of this student were not collected, disparities in the representation of different Asian communities in STEM have been noted in the literature. For example, Southeast Asian students are underrepresented in STEM compared to students with other geographical Asian heritage such as Chinese or South Korean origin (Byars-Winston, Estrada, Howard, Davis, & Zalapa, 2010). A similar geographic inequality exists among Latina/o individuals. Mexican Americans and Puerto Ricans are among the least represented Latina/o individuals in STEM while Cubans tend to have better educational outcomes (Leggon, 2010). This disparity in the educational success of Cubans as compared to other Latina/o individuals is likely influenced by U.S. laws and policies. Due to federal policies stemming from the 1966 Cuban Adjustment Act, Cubans are easily and rapidly granted access to economic resources and legal privileges such as permanent residence status if they seek political asylum on U.S. soil (Hamlin, 2015). In contrast, individuals from Mexico, South America, and Haiti fleeing violence and persecution (and therefore equally or even more worthy of claiming political asylum as their Cuban counterparts) are often deemed to be illegal immigrants and slated for deportation back to their home country (Hamlin, 2015). To gain a better understanding of the possible geographic differences among Asian and Latina/o individuals, a revised version of SGEMS should include options for participants, particularly Asian and Latina/o participants, to indicate their geographic heritage.

Overall, the findings of this study point to URMs and females encountering psychological barriers rooted in their STEM graduate environment. A very recent national survey of URM doctoral students provides additional insight into the challenges these students face. Sowell, Allum, and Okahana (2015) surveyed URM doctoral students from 21 institutions and found that 62% of participants in STEM doctoral programs reported being worried for their mental or physical health and 54% reported losing interest in their STEM field. The survey did not explicitly explore the role racism and sexism may have played in their responses. However, in focus group interviews at selected institutions, a common theme discussed by participants was constantly feeling judgment and pressure to perform well because of their racial minority status (Sowell et al., 2015). Sowell and his colleagues' findings, in conjunction with the findings of this study, signal racism is worthy of careful and explicit exploration by researchers seeking to improve racial diversity in STEM doctorates.

The call for education research to investigate how individuals, especially those with intersecting social identities such as Black females, unevenly experience institutional environments because of these often marginalized identities and how this unevenness limits their academic and life chances has grown louder and more insistent in recent years (Anthias, 2013; Collins, 2007; Ladson-Billings, 2012; Núñez, 2014). The call has grown louder and more insistent because when researchers explicitly examine how institutional cultures disproportionately advantage some identities and disadvantage others they also explicitly challenge the institutional systems that perpetuate educational inequities (Anthias, 2013). This study explicitly examined how racial and gender identities link to inequitable sociocultural STEM graduate experiences, and through this explicit examination, discovered that despite access to undergraduate opportunities such as research experiences and financial support, URM graduate students continue to experience the longstanding system of sociocultural inequities in STEM graduate programs. Through such explicit examinations researchers can not only highlight race and gender based inequities, but challenge and encourage administrators and policymakers to create STEM graduate environments free of oppression.

Future Research

Latina/o and Native American Scholars comprise more than a quarter of all McNair Scholars nationally; however, they were not represented in this study's sample population. Therefore, the URM student experiences broadly discussed in this study are more closely related to how Black Scholars experienced their STEM graduate program. A study which included a larger population would also likely capture more male participants. Despite male Scholars' higher probability of doctoral success, both male and female URM representation in STEM remains persistently low both within and outside of the McNair Scholar population. Male URM participation when compared to female participation in STEM is at a more acute crisis point nationally (NSF & NCSES, 2015). Yet, male URM STEM experiences receive much less attention than female URM individuals' experiences (Malcom & Malcom, 2011). To acquire a more comprehensive perspective of the URM McNair Scholars' experience a larger study, which would likely incorporate more students who identify as male and/or Latina/o and Native American, is needed.

URM Scholars responses indicated predominantly positive perceptions of their academic and emotional relationship with their advisors. It was reasonable to assume participating Scholars'

advisors and other program faculty were predominantly White or Asian males given their national dominance in U.S. STEM higher education tenured faculty (Martinez, Miller, & Tyson, 2014). Women and URM individuals experience reduced stereotype threat, display higher competency, and have higher engagement in the presence of other women and URMs in STEM environments (Holleran, Whitehead, Schmader, & Mehl, 2010; Whitaker & Montgomery, 2012). However, whether this is a reasonable explanation for Scholars' overwhelmingly positive perceptions of their advisors remains unclear. Therefore, future research should collect data about advisor and faculty gender and race/ethnic identity.

Author Notes

Senetta F. Bancroft held a postdoctoral research fellowship at Grand Valley State University while completing this manuscript and is now an Assistant Professor with joint appointment in the Department of Curriculum and Instruction and the Department of Chemistry and Biochemistry at Southern Illinois University-Carbondale.

Susan Kushner Benson is an Associate Professor in the College of Education at the University of Akron.

Eugenia Johnson-Whitt is an Assistant Professor at Walsh University in the Department of Education.

Correspondence concerning this article should be addressed to Senetta F. Bancroft at sfp4@zips.uakron.edu.

References

Anthias, F. (2013). Intersectional what? Social divisions, intersectionality and levels of analysis. *Ethnicities, 13*(1), 3–19.

Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology, 38*(2), 113-125.

Augustine, N. R. (2005). *Rising above the gathering storm: Energizing and employing America for a brighter economic future.* Retrieved from http://www.mdworkforce.com/pub/pdf/aaugustine10202005.pdf

Bancroft, S. (2013). Capital, kinship, and white privilege: Social and cultural influences upon the minority doctoral experience in the sciences. *Multicultural Education*, *20*(2), 10-16.

Bancroft, S. F. (2014). *A critical exploration of science doctoral programs: Counterstories from underrepresented women of color* (Doctoral dissertation). Retrieved from OhioLink Database (Document No. akron1415633379).

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Barker, M. J. (2011). Racial context, currency and connections: Black doctoral student and white advisor perspectives on cross-race advising. *Innovations in Education and Teaching International*, *48*(4), 387-400.

Barnes, B. J., & Austin, A. E. (2009). The role of doctoral advisors: A look at advising from the advisor's perspective. *Innovative Higher Education*, *33*(5), 297-315.

Bell, D. (1995). Who's afraid of critical race theory? *University of Illinois Law Review*, *4*, 893-910.

Blackwell, L. V., Snyder, L. A., & Mavriplis, C. (2009). Diverse faculty in STEM fields: Attitudes, performance, and fair treatment. *Journal of Diversity in Higher Education*, *2*(4), 195-205.

Bobo, L. D., & Charles, C. Z. (2009). Race in the American mind: From the Moynihan report to the Obama candidacy. *The ANNALS of the American Academy of Political and Social Science, 621*(1), 243-259.

Brown v. Board of Education, 347 U.S. 483 (1954).

Byars-Winston, A., Estrada, Y., Howard, C., Davis, D., & Zalapa, J. (2010). Influence of social cognitive and ethnic variables on academic goals of underrepresented students in science and engineering: a multiple-groups analysis. *Journal of Counseling Psychology*, *57*(2), 205-218.

Capdevila, R. (2007). Redefinition reviewed: What 'toward a redefinition of sex and gender' can offer today. *Feminism & Psychology*, *17*(4), 465–469.

Chapman, T. K. (2006). Pedaling backwards: Reflections of Plessy and Brown in Rockford Public Schools de Jure desegregation efforts. In A. D. Dixson & C. K. Rousseau (Eds.), *Critical race theory in education: All god's children got a song* (pp. 67-88). New York, NY: Routledge.

Collins, P. H. (2007). Pushing the boundaries or business as usual? Race, class, and gender studies in sociological inquiry. In C. Calhoun (Ed.), *Sociology in America: A history* (pp. 572–604). Chicago, IL: University of Chicago Press.

Committee on Challenges in Chemistry Graduate Education, Board on Chemical Sciences and Technology, Division on Earth and Life Studies, & National Research Council. (2012). *Challenges in chemistry graduate education: A workshop summary.* Washington, DC: The National Academies Press.

Committee on Prospering in the Global Economy of the 21st Century: An agenda for American science and technology, & Committee on Science, Engineering, and Public Policy. (2007). *Rising above the gathering storm: Energizing and employing America for a brighter economic future.* Washington, DC: The National Academies Press.

Council of Graduate Schools. (2009). *Ph.D. completion and attrition: Analysis of baseline demographic data from the Ph.D. completion program.* Washington, DC: Council of Graduate Schools.

Delgado, R., & Stefancic, J. (2012). *Critical race theory: An introduction* (2nd ed.). New York, NY: New York University Press.

Deutskens, E., De Ruyter, K., Wetzels, M., & Oosterveld, P. (2004). Response rate and response quality of internet-based surveys: An experimental study. *Marketing letters*, *15*(1), 21-36.

Dick, W., & Carey, L., & Carey, J. (2014). *The systematic design of instruction* (8th ed.). New York, NY: Pearson.

Eagan Jr., M. K., & Newman, C. B. (2010). *Investing in human capital: Underrepresented racial minorities' intentions to attend graduate school in STEM fields*. Unpublished manuscript. Los Angeles, CA: UCLA Higher Education Research Institute.

Educational Testing Service. (2015). GRE. Retrieved from http://www.ets.org/gre

Elliott, M. J., Stewart K. K., & Lagowski J. J. (2008). The role of the laboratory in chemistry instruction. *Journal of Chemical Education*, *85*(1), 145.

Fox, M. F. (1999). Gender, hierarchy, and science. In J. S. Chafetz (Ed.), *Handbook of the Sociology of Gender* (pp. 441– 458). New York, NY: Kluwer Academic/Plenum Press.

Frankenberg, E., Lee, C., & Orfield, G. (2003). *A multiracial society with segregated schools: Are we losing the dream?* Cambridge, MA: Civil Rights Project, Harvard University.

Freeman, R. B. (2006). Does globalization of the scientific/engineering workforce threaten US economic leadership? In A. B. Jaffe, J. Lerner, & S. Stern (Eds.), *Innovation Policy and the Economy* (Vol. 6; pp. 123-158). Cambridge, MA: The MIT Press.

Gildersleeve, R. E., Croom, N. N., & Vasquez, P. L. (2011). "Am I going crazy?!": A critical race analysis of doctoral education. *Equity & Excellence in Education, 44*(1), 93-114.

Golde, C. M. (1998). Beginning graduate school: Explaining first-year doctoral attrition. *New Directions for Higher Education,* 101, 55-64.

Graddol, D., & Swann, J. (1989). *Gender voices*. Oxford, UK: Blackwell.

Haig, D. (2004). The inexorable rise of gender and the decline of sex: Social change in academic titles, 1945–2001. *Archives of Sexual Behavior*, *33*(2), 87–96.

Hamlin, R. (2015). Ideology, international law, and the INS: The development of American asylum politics 1948–present. *Polity*, *47*(3), 320-336.

Harding, S. (2008). *Sciences from below: Feminisms, postcolonialities, and modernities.* Durham, NC: Duke University Press.

Hill, J. H. (2008). *The everyday language of white racism*. Malden, MA: Wiley-Blackwell.

Holleran, S. E., Whitehead, J., Schmader, T., & Mehl, M. R. (2010). Talking shop and shooting the breeze: A study of workplace conversation and job disengagement among STEM faculty. *Social Psychological and Personality Science*, *2*(1), 65-71.

Hooks, B. (1995). *Killing rage: Ending racism*. New York, NY: Henry Holt.

Hunt, M. O. (2007). African American, Hispanic, and White belief about Black/White inequality, 1977-2004. *American Sociological Review*, *72*(3), 390-415.

Kincheloe, J. L., & McLaren, P. (2000). Rethinking critical theory and qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed.; pp. 279-313). Thousand Oaks: CA: Sage.

Ladson-Billings, G. (2012). Through a glass darkly: The persistence of race in education research & scholarship. *Educational Researcher*, *41*(4), 115-120.

Leggon, C. B. (2010). Diversifying science and engineering faculties: Intersections of race, ethnicity, and gender. *American Behavioral Scientist*, *53*(7), 1013-1028.

Lewis, B. F. (2003). A critique of the literature on the underrepresentation of African Americans in science: Directions for future research. *Journal of Women and Minorities in Science and Engineering, 9*(3/4), 361-373.

Logel, C., Walton, G. M., Spencer, S. J., Iserman, E. C., von Hippel, W., & Bell, A. E. (2009). Interacting with sexist men triggers social identity threat among female engineers. *Journal of Personality and Social Psychology*, *96*(6), 1089.

Lundberg, C. A., & Schreiner, L. A. (2004). Quality and frequency of faculty-student interaction as predictors of learning: An analysis by student race/ethnicity. *Journal of College Student Development*, *45*(5), 549-565.

Macionis, J. J., & Gerber, L. M. (2011). *Sociology* (7th ed.). Toronto: Pearson Canada.

Malcom, L., & Malcom, S. (2011). The double bind: The next generation. *Harvard Educational Review*, *81*(2), 162-172.

Marburger, J. H. (2002). Science policy after September 11. *Colloquium on Science and Technology Policy*, *11*, 5-13.

Mar'i, S. K. (1988). Challenges to minority counseling: Arabs in Israel. *International Journal of the Advancement of Counseling*, *11*(1), 5–21.

Martinez, V., Miller, M. H., & Tyson, W. (2014). Analyzing STEM faculty demographics and faculty climate survey. In *Alliances for Advancing Academic Women* (pp. 79-96). Boston, MA: Sense Publishers.

McCoy, A., Wilkinson, A., & Jackson, R. (2008). *Education and employment outcomes of the Ronald E. McNair Postbaccalaureate Achievement Program alumni*. Washington, DC: U.S. Department of Education.

Mendoza, P. (2007). Academic capitalism and doctoral student socialization: A case study. *The Journal of Higher Education*, *78*(1), 71-96.

Mohanty, C. T. (2003). *Feminism without borders: Decolonizing theory, practicing solidarity*. Durham, NC: Duke University Press.

National Academy of Sciences. (2011). *Expanding underrepresented minority participation: America's science and technology talent at the crossroads.* Washington, DC: National Academy of Sciences.

National Institutes of Health. (n.d.). Research to Understand and Inform Interventions that Promote the Research Careers of Students in Biomedical and Behavioral Sciences (R01). Retrieved February 2014, http://grants.nih.gov/grants/guide/rfa-files/RFA-GM-12-002.html

National Science Foundation and National Center for Education Statistics. (2013). *Women, minorities, and persons with disabilities in science and engineering: 2013.* (Special Report No. NSF 11-309). Arlington, VA: National Science Foundation, Division of Science Resources Statistics. Retrieved from http://www.nsf.gov/statistics/wmpd/2013/digest/theme2_2.cfm#underrepresented_minorities

National Science Foundation and National Center for Education Statistics. (2015). *Women, minorities, and persons with disabilities in science and engineering: 2015.* (Special Report No. NSF 15-311). Arlington, VA: National Science Foundation, Division of Science Resources Statistics. Retrieved from http://www.nsf.gov/statistics/2015/nsf15311/digest/theme3.cfm

Noguera, P. A. (2008). *The trouble with black boys: ...And other reflections on race, equity, and the future of public education*. San Francisco, CA: Jossey-Bass.

Núñez, A. M. (2014). Employing multilevel intersectionality in educational research Latino identities, contexts, and college access. *Educational Researcher*, *43*(2), 85-92.

Ong, M., Wright, C., Espinosa, L. L., & Orfield, G. (2011). Inside the double bind: A synthesis of empirical research on undergraduate and graduate women of color in science, technology, engineering, and mathematics. *Harvard Educational Review*, *81*(2), 172-209.

Paglis, L. L., Green, S. G., & Bauer, T. N. (2006). Does adviser mentoring add value? A longitudinal study of mentoring and doctoral student outcomes. *Research in Higher Education*, *47*(4), 451-476.

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research* (Vol. 2). San Francisco, CA: Jossey-Bass.

Patterson, J. T. (2001). *Brown v. Board of Education: A civil rights milestone and its troubled legacy*. New York, NY: Oxford University Press.

Qualtrics [Computer software]. Provo, UT: Qualtrics LLC.

Rocke, A. J. (2003). Origins and spread of the "Giessen model" in university science. *Ambix*, *50*(1), 90-115.

Sowell, R., Allum, J., & Okahana, H. (2015). *Doctoral initiative on minority attrition and completion*. Washington, DC: Council of Graduate Schools.

Steele, C. M. (1997). A threat in the air: How stereotypes shape the intellectual identity and performance. *American Psychologist*, *52*(6), 613-629.

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *69*(5), 797-811.

Sweitzer, V. B. (2009). Towards a theory of doctoral student professional identity development: A developmental networks approach. *The Journal of Higher Education*, *80*(1), 1-33.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago, IL: University of Chicago Press.

Unger, R. K. (1979). Toward a redefinition of sex and gender. *American Psychologist*, *34*(11), 1085–1094

U.S. Department of Education. (n.d.). *Ronald E. McNair Postbaccalaureate Achievement Program*. Retrieved from http://www2.ed.gov/programs/triomcnair/index.html

U.S. Census Bureau. (2010). *US Census Bureau report*. Retrieved from http://2010.census.gov/2010census/data/

Villenas, S., & Deyhle, D. (1999). Critical race theory and ethnographies challenging the stereotypes: Latino families, schooling, resilience and resistance. *Curriculum Inquiry*, *29*(4), 413-445.

Weick, K. E., & Quinn, R. E. (1999). Organizational change and development. *Annual Review of Psychology, 50*(1), 361–386.

Weidman, J. C., Twale D. J., & Stein, E. L. (2001). Socialization of graduate and professional students in higher education: A perilous passage? *ASHE-ERIC Higher Education Report*, *28*(3). San Francisco, CA: Jossey-Bass.

Whittaker, J. A., & Montgomery, B. L. (2012). Cultivating diversity and competency in STEM: Challenges and remedies for removing virtual barriers to constructing diverse higher education communities of success. *Journal of Undergraduate Neuroscience Education*, *11*(1), A44-A51.

Zhao, C. M., Golde, C. M., & McCormick, A. C. (2007). More than a signature: How advisor choice and advisor behaviour affect doctoral student satisfaction. *Journal of Further and Higher Education*, *31*(3), 263-281.

Appendix. Survey of Graduate Experiences of McNair Scholars (SGEMS)

1. Participation in the McNair Program….

	Strongly Agree	*Agree*	*Disagree*	*Strongly Disagree*
was a significant factor for gaining entry into my graduate program.				
prepared me for conducting graduate level research.				
prepared me for formal social interactions (eg. conferences, department gatherings) with peers and faculty in my graduate program.				
prepared me for informal social interactions with peers and faculty in my graduate program.				
was an important factor in securing financial support for my graduate studies.				

2. How would you rate your level of social support as you pursue your graduate studies?

	Strongly Agree	*Agree*	*Disagree*	*Strongly Disagree*
My family is supportive of my decision to pursue a graduate degree.				
My family understands the successes and challenges of being a graduate student.				
I have found at least one person within my graduate program with whom I freely share my successes and challenges.				
I easily form friendships with graduate students in my department.				

3. How would you rate your communication skills?

	Strongly Agree	*Agree*	*Disagree*	*Strongly Disagree*
I am confident in my communication skills.				
I prefer working in the lab (or other research space) when other graduate students are present.				
I feel comfortable discussing my				

research with other graduate students.				
I feel comfortable discussing my research with my advisor.				
I feel comfortable discussing research with professors other than my advisor.				

4. My advisor…

	Strongly Agree	*Agree*	*Disagree*	*Strongly Disagree*
supports me academically.				
supports me emotionally.				
understands the challenges I face as a low-income, first generation, and/or minority student in a STEM graduate program.				

5. Rank your reasons for pursuing a graduate degree in order of importance from 1 (most important) to 3 (least important).

My personal growth	
Securing the career I desired	
I enjoy conducting research	

6. I feel that because of my gender...

	Strongly Agree	*Agree*	*Disagree*	*Strongly Disagree*
my professors make academic judgments about me.				
my professors make personal judgments about me.				
other graduate students make academic judgments about me.				
other graduate students make personal judgments about me.				
I have a heightened awareness of representing everyone of that race.				
I must work harder than my peers.				

7. I feel that because of my race...

	Strongly Agree	*Agree*	*Disagree*	*Strongly Disagree*
my professors make academic judgments about me.				
my professors make personal judgments about me.				

other graduate students make academic judgments about me.				
other graduate students make personal judgments about me.				
I have a heightened awareness of representing everyone of that race.				
I must work harder than my peers.				

8. **To what degree have you maintained contact with other McNair scholars?**

   A great deal of contact
   Some contact
   Very little contact
   No Contact al all

9. **The McNair Program continues to provide me with support as I pursue my graduate degree**

   Strongly Agree Agree Disagree Strongly Disagree

10. **My cultural identity (as defined by preferences for ways of dressing and/or talking, race and/or ethnicity) conflicts with the cultural norms of my graduate program**

    Strongly Agree Agree Disagree Strongly Disagree

11. **I am equally comfortable negotiating an environment that reflects my cultural identity (for example being with your family) and the environment of my graduate program**

    Strongly Agree Agree Disagree Strongly Disagree

12. **How likely is that you will have one or more publications before you graduate?**

    Very Likely Somewhat Likely Not Likely at All

13. **What graduate program level are you currently enrolled?**

    Masters
    Doctoral

14. **What is your current area of study?**

    Medical Sciences
    Mathematics
    Social Sciences
    Physical Sciences

Biological Sciences
Engineering
Computer Sciences
Other_____

15. Have you departed from a previous master's degree program? If yes, please indicate the area of study.

Yes _____
No

16. Have you departed from a previous doctoral degree program? If yes, please indicate the area of study.

Yes _____
No

17. Do you hold a master's or doctoral degree? If yes, please indicate the area of study.

Yes _____
No

18. How many years have you spent in your current graduate program?

0-1 years
2-4 years
5-7 years
More than 7 years

19. What form of financial support do you have (or have had) during your graduate studies? (Circle all that apply)

Teaching Assistantship
Research Assistantship
Fellowship
Grant
Loan
Other_____

20. Select your gender:

Female
Male
Transgender
Other _____

21. Please select your race/ethnicity (<u>select all that apply</u>):

Black (Non-Hispanic)	Alaskan Native	Other _____
Hispanic	East Indian	
Asian	Native American	
White	Pacific Islander	

22. Based on your graduate experience so far, do you feel there are experiences the McNair Program underprepared or did not prepare you for?

Yes
No

23. If you answered <u>yes to question 22</u>, describe up to three forms of preparation you feel would have been helpful during your graduate studies.

1. _____
2. _____
3. _____