Chapter 3. Mentoring Strategies that Support Underserved Students in Undergraduate Research

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In *Excellence in Mentoring Undergraduate Research,* Edited by J. Moore, M. Vandermaas-Peeler, & P. Miller. 2018. Washington, DC: Council on Undergraduate Research (CUR).

The numerous, well-established benefits of participating in undergraduate research (UR)—including significantly higher rates of retention and graduation, campus engagement, academic achievement, self-efficacy, and analytical and communication skills—are most pronounced for students who have been underserved in higher education: students of color and low-income and first-generation students. Supportive relationships with mentors and the advantageous opportunities afforded by participation in UR are particularly beneficial for students from historically underserved groups (Brownell and Swaner 2010; Gregerman 2009; Hernandez, Schultz, Estrada, Woodcock and Chance 2013; Jones, Barlow, and Villarejo 2010; Kinzie, Gonyea, Shoup, and Kuh 2008; Kuh 2008; Kuh and O'Donnell 2013; Linn, Palmer, Baranger, Gerard and Stone 2015; Locks and Gregerman 2008; Osborn and Karukstis 2009). Yet research indicates that access to UR still disproportionately favors economically advantaged students with family legacies of higher education (Carpi, Ronan, Falconer and Lents 2016; Finley and McNair 2013; Osborn and Karukstis 2009). As the former Director of Undergraduate Research and current Assistant Provost at a diverse, public, comprehensive university with an explicit commitment to social justice, I have been studying and working to change that disparity. This chapter emerges from my research on the myriad benefits of broader, more inclusive participation in UR; the barriers to equitable access; and successful approaches for welcoming and supporting students from underserved groups in this high-impact practice.

Broadening access to UR requires considerable investment of institutional resources as well as individual and collective efforts of faculty and administrators (Carpi et al. 2016; Finley and McNair 2013; O'Donnell, Botelho, Brown, González, and Head 2015). Among those investments, the most significant area of focus for more equitable student participation in UR is effective *mentoring* (Linn et al. 2015; Shanahan, Ackley-Holbrook, Hall, Stewart, and Walkington 2015a). This chapter lays out my research about and advocacy for forms of UR mentoring that have been shown to promote the success of students from historically underserved groups. The research and recommendations comprise the following sources and methods: (a) analysis of relevant theories of identity formation, (b) review of the literature on underserved student participation in UR, and (c) original research I have conducted at Bridgewater State University in Massachusetts, an institution that has made significant commitments to support underserved students in UR.

Undergraduate Research at Bridgewater State University

At Bridgewater State University (BSU), where I served as Director of Undergraduate Research 2010-2017 and am now Assistant Provost for High-Impact Practices, ensuring equitable access to UR opportunities is a matter of social justice. Social justice—"the promotion of fairness, equal access, equal opportunity and the assurance of basic human rights to all persons"—is a "core value" of BSU, a comprehensive public university founded in 1840 by Horace Mann, the "father" of free, universal, public education in the United States ("Social justice" n.d., para. 1). Two-thirds of our nearly 10,000 undergraduate students are from one or more underserved groups: they are first in their families to attend college, are students of color, and/or are eligible for Pell grants (Bridgewater State University 2016). Investment in UR is part

of the university's social-justice mission because it helps "level the playing field," advancing underserved students' self-confidence, sense of belonging in academia, and access to graduate and professional education that students with a family legacy of higher education more often possess (Shanahan, Liu, Manak, Miller, Tan, and Yu 2015b). Institutional data corroborate findings in the literature that students involved in UR have higher persistence rates than their peers. For example, 85.4% of students who participate in UR in their first year persist to their second year at BSU, compared to 81.3% of all first-year students. The gains in persistence and graduation rates correlated with participation in UR are highest for students of color. The Education Trust recently named BSU in the top 10 of the nation's four-year public institutions that are closing the gap in graduation rates between underrepresented minority students and White students (The Education Trust 2015). An intentionally inclusive UR program (e.g., 24% of undergraduate researchers at BSU are students of color—more than the overall student body, of which 21% are students of color) contributes to that success.

At least 18% of BSU students (n > 1,780) had a research experience in the 2015-2016 academic year that meets these characteristics of high-quality UR: original scholarly work that is mentored by a faculty member, appropriate to the discipline, and disseminated, in this case usually at a campus symposium (Osborn and Karukstis 2009). Of those over 1,780 students, 208 received funding from the Office of Undergraduate Research, for conference travel, a summer UR stipend, and/or research supplies and expenses. And of those grant-funded students, 95 from underserved groups responded to a confidential survey in 2016 about their research experience and relationship with their faculty mentor. Descriptive responses from those 95 students—to open-response questions about how they first became involved in UR, how satisfied they were with their relationship with their mentor and their overall research experience, how support from their mentor benefited them, and what additional forms of support they would have liked—are shared in this chapter to elucidate data from the literature about underserved students in UR.

An additional 33 BSU students from underserved groups responded to a survey in the 2015-2016 academic year about their participation in a program known as SOAR (Student Opportunities as Apprentice Researchers). SOAR matches up to 40 first- and second-year students from underserved groups with faculty mentors in their intended area of study (Manak and Shanahan 2015). SOAR students work an average of six hours per week as "research apprentices," learning critical research skills while assisting faculty mentors' with their scholarship. They earn minimum wage, which is funded primarily by federal Work-Study financial aid. SOAR students meet regularly with me and other staff in High-Impact Practices, individually and in small groups, to check in about their work and learn cross-disciplinary research skills. Selected responses from the SOAR student survey are included in this chapter. Faculty mentors of SOAR students also communicate regularly with me about how the work is progressing. With their permission, some SOAR faculty-mentor experiences are shared in this chapter to flesh out the findings in the literature about effective practices of mentoring underserved students in UR.

Advantages of Diverse Undergraduate Research Teams and Programs

Multiple studies in the past decade have attested to the distinct benefits for underserved students of participating in UR (Brownell and Swaner 2010; Campbell and Campbell 2007; Gregerman 2009; Hernandez et al. 2013; Jones et al. 2010; Kinzie et al. 2008; Kuh 2008; Kuh and O'Donnell 2013; Linn et al. 2015; Locks and Gregerman 2008). It stands to reason, though, that the benefits of inclusive UR programs that involve a diversity of students could extend to everyone involved—students and faculty in majority and minority groups. Studies of different

contexts of collaborative scholarly work have concluded that diverse teams of students and researchers were more productive, innovative, and successful in their work than were homogenous groups (Campbell, Mehtani, Dozier, and Rinehart 2013; Freeman and Huang 2014; Galinksy et al. 2015; Hu and Kuh 2003; Phillips, 2014). Researchers have suggested that collaborators with varied perspectives work through challenges and conflicts to arrive at more nuanced and significant conclusions than when they assume everyone on the team shares the same interpretations (Apfelbaum, Phillips, and Richeson 2014; Galinsky et al. 2015; Samovar, Porter, McDaniel, and Roy 2009). Bringing together studies on the effectiveness of diverse research teams with studies on the benefits for diverse groups of undergraduates who participate in research, one could determine that an inclusive approach to faculty-student scholarly collaborations is vital to the success of UR. More than any previous generation of college students, our students in the U.S. today have a multiplicity of ethnic and racial backgrounds, family and educational experiences, and perspectives to bring to bear on scholarly work, offering exciting possibilities for contributing richly to the creation of knowledge as well as transforming the lives of student-researchers themselves.

Challenges of Mentoring Underserved Students: Systemic and Individual Biases

At least two significant challenges need to be addressed when it comes to creating and supporting diverse teams of undergraduate researchers: systemic and individual biases, and the need for effective management of groups that are working across difference. Despite evidence that students from underserved groups benefit most from mentored research opportunities, such high-impact opportunities are still disproportionally made available to students from advantaged backgrounds (Carpi et al. 2016; Finley and McNair 2013; Osborn and Karukstis 2009). Therefore, those of us committed to inclusive, diverse collaborations have to work intentionally against an entrenched academic culture that replicates what has been done in the past. The inequity in research opportunities persists for myriad reasons, from unconscious bias about who is prepared for scholarly work, to narrow recruitment of students with enough economic security to take on unpaid research positions.

Researchers have shown that we tend to choose collaborators with whom we perceive the smallest "social distance," forming groups "fastest and easiest with people most like [ourselves]. Deep-seated biases make [us] more trusting of those who look most like [us], who think like [us], or with whom [we] have the most in common," including race and ethnicity, gender, age, and religion (Wagner and Muller 2009, 1). A case in point: a male professor of physics once said to me during Q&A at a conference session that he thought there were sometimes legitimate reasons for forming homogenous UR teams; he said that a female student would not feel comfortable in his research group because the work of tracking exoplanets involved late nights in the observatory with other research students, all of whom were male. For female students' presumed comfort and safety the professor said he would not invite women to join that particular research. Women in STEM fields have long encountered such statements—some subtle, some blatantly discriminatory—about being perceived as disruptive to the research group, unprepared, or otherwise unsuited to scholarly work. The notion about which kinds of people will "work well" on a research team and which will not, due to gender, race, ethnicity, sexual orientation, and/or other forms of identity, are common and often implicit. It takes deliberate action and creative thinking to overturn them, first within ourselves. As Wagner and Muller noted in their research on effective collaborations, "Great partnerships don't just happen"; being inviting by those at a social distance takes conscious effort and "active acceptance" of differences (2009, 7).

Similar assumptions about potential research collaborators are often unintentionally based on socio-economic class. During the summer, when professors with heavy teaching responsibilities during the academic year can usually make the most progress on their scholarship, many students work longer hours to pay for school. It stands to reason that students most likely to volunteer on a summer research study are those with less pressing need for a steady income or who have enough material resources in place to manage a cut in pay. Financial support for summer undergraduate researchers is critical for creating an inclusive program. An Archaeology major in Bridgewater State University's SOAR program for students from underserved groups had to turn down an appealing summer fieldwork opportunity at a dig site known to contain pre-contact artifacts because she had no access to reliable transportation to a site far from any bus routes. Students participating in the dig had to commit to getting to the remote site every weekday morning and pay tuition for course credit for the summer experience. Balancing the archeological fieldwork with full-time summer employment was not possible.

On many campuses Friday afternoons offer open blocks of time when few classes and meetings are scheduled—a perfect time for UR to take place, but also ideal for paid work, especially for students with jobs in service and hospitality industries, where the weekend starts on Friday afternoon. Dozens of BSU students interested in UR have told me over the years that they could not join a lab group because they had to work Friday afternoons. These examples illustrate why low-income students, who might benefit most from UR, cannot always access the opportunities. Faculty and administrators seeking to involve students from underserved groups in UR must attune to both equitable access and inclusive practices. A BSU faculty member in Biology who moved his lab meetings to Mondays to accommodate students' Friday work schedules said to me that since then he has been inundated with requests from underrepresented minority students to join his lab.

Challenges of Mentoring Underserved Students: Need for Effective Group Management

The second challenge in building and sustaining diverse involvement in UR is the reality that diverse groups need good management that fosters intellectual debate while bridging potential "fault lines" along demographics and identities. Several researchers have reported on the risk of latent conflict and resistance, most often by those in the majority group, when collaborating across difference (Cortina 2008; Marin 2000; Plaut, Garnett, Buffardi, and Sanchez-Burks 2011). The implications of research on diverse groups are that collaboration can actually be counterproductive if not managed effectively. Faculty without experience collaborating with diverse students could understandably feel unsure about how to help generate effectual group dynamics while advancing the research.

Galinsky et al. (2015) and Marin (2000) explained that focused efforts by mentors/leaders are needed to reduce bias, especially unintentional bias, and to guide group members toward creative thinking and good decision-making. They recommended framing the benefits of multicultural collaboration for all involved and practicing perspective-taking, or "imagining the world from another's vantage point" (Galinsky et al. 2015, 4). A professor in Elementary Education at Bridgewater State who mentors diverse teams of undergraduate researchers in field research in socio-economically and racially diverse elementary schools, intentionally works with students on perspective-taking and resisting bias. She talks with students about the double-sided problem of condescending statements and/or holding a "deficit mindset" when working in environments different from what they may be accustomed to. Her students consider from the outset how assumptions about individual and groups of elementary schoolchildren, their family backgrounds, and academic experiences in a particular school in a particular neighborhood,

could both degrade the quality of their work as researchers and potentially cause rifts among group members, each of whom has a unique home and school context. My research that this chapter emerged from had an objective similar to that of my Elementary Education faculty colleague—to offer practical suggestions for perspective-taking, with the goal of creating equitable and inclusive scholarly collaborations with diverse students. Actions to address systemic and individual biases and create intentionally inclusive collaborations with students help produce profound benefits—for students, faculty, and institutions of higher education.

Focus on the Socio-Emotional Support of Mentors

What we know as "undergraduate research" has changed dramatically in the last decade, in its definitions, contexts, models, and structures. Most notably, mentored scholarly work by undergraduate students has spread well beyond the laboratory sciences to every academic discipline, expanded from one-on-one and small-group mentoring to include course-based research experiences, and moved from primarily undergraduate four-year colleges into diverse institutions of higher education around the world. The years ahead promise continued growth and innovation as the high-impact practice of UR is correlated with student success. Through those major changes in the practice of UR, at least one facet has remained constant: effective mentoring is essential to its success (Shanahan et al. 2015a). That point is especially pertinent for underserved students, whose success in UR has been consistently connected to the mentoring they have received (Campbell and Campbell 2007; Davis 2007; Osborne and Karukstis 2009; Kendricks, Nedunuri, and Arment 2013; Locks and Gregerman 2008; Wilson et al. 2012).

Social-emotional support is foundational to the mentoring relationship (Johnson 2006). Several scholars have captured data from students across demographic groups and types of institutions who highly valued the personal support from their research mentors (Falconer and Holcomb 2008; Hakim 1998; Ishiyama 2007; Kardash 2000; Mabrouk and Peters 2000; Mekolichick and Gibbs 2012; Shellito, Shea, Weissmann, Mueller-Solger and Davis 2001; Showman, Cat, Cook, Holloway and Wittman 2013; Thiry and Laursen 2011; Yaffe, Bender and Sechrest 2012). Johnson noted that "skilled and supportive mentors" influence their students' academic achievement and bring about "highly meaningful" interpersonal gains (2006, 7). In some studies, students have gauged the affective and relational components of their mentored research experience as even more important than what they learned and produced from their research; specifically, students reported appreciating mentor behaviors and traits that contributed to their close personal relationships with their mentors, such as trustworthiness and a high level of availability through regular one-on-one meetings (Gafney 2005; Falconer and Holcomb 2008; Lopatto 2004; Mekolichick and Gibbs 2012; Shellito et al. 2001).

Social-emotional support by mentors has been shown to be even more significant for underrepresented minority students involved in UR than for their peers in the majority. Students of color have emphasized most the importance of their mentors' personal responsiveness and emotional support (Davis 2007; Ishiyama 2007; Kendricks et al. 2013; Mekolichick and Gibbs 2012; Schwartz 2011). Whereas students across demographic groups conveyed appreciation for traits of trustworthiness and warmth in their UR mentors, White students and those with a family legacy of higher education also placed high value on help with networking and getting started in their careers (Ishiyama 2007; Mekolichick and Gibbs 2012). For students of color, however, having a faculty mentor whom they could trust was deemed more important than any other aspect of participating in research. For underrepresented minority students, the "affective and interpersonal nature of the undergraduate research relationship may be just as significant as the academic" (Schwartz 2011, 537). Other researchers have likewise concluded that UR mentors of

underserved students require heightened attentiveness to empathy and emotional output (Kendricks et al. 2013; Wilson et al. 2012).

Social-emotional support from mentors allows trust to form. And that trusted assurance of care provides the space for underserved students to succeed in research and realize its far-reaching benefits. In numerous surveys and interviews reported in the literature in the past ten years, students of color and first-generation and low-income students who have participated in UR have called for specific forms of social-emotional support from their faculty mentors. Results from my surveys of underserved students involved in UR at Bridgewater State University have helped elucidate those forms of support. They can be organized into five prominent themes:

- Seeking out and recruiting diverse students intentionally
- Bridge-building between academia and home life
- Alleviating minority students' "racial battle fatigue" and isolation on campus
- Committing to a long-term relationship with student-researchers and making oneself accessible and open to their needs
- Advocating for and sharing power with students, especially through professional socialization

Each of the themes is described in turn in the following pages, with explanation from relevant theories of identity-formation, data from the literature, and qualitative survey responses by underserved students at my institution, Bridgewater State University.

Seeking Out and Recruiting Diverse Students Intentionally

Intentionality is the first step to creating equitable access to UR. As indicated in the literature about effective mentoring (notably, Johnson 2006) and Gallup research on productive collaborations (Wagner and Muller 2009), successful faculty-student research partnerships do not happen by accident. Conscientious, deliberate efforts by mentors are needed to seek out and welcome students from historically underserved groups.

Stephens, Fryberg, Markus, Johnson, and Covarrubias (2012) theorized that cultural obstacles in American universities have contributed to an achievement gap based on socio-economic class. Their research showed that universities operate on cultural norms unfamiliar to first-generation, working-class students. Specifically, university administrators and faculty were found to value what the researchers labeled *independent* social norms—expectations that students act of their own volition, independent of others' expectations, and that they influence or make an impact on the world. Stephens et al. found that university values of independent thinkers align with how U.S. students of middle- and upper-class backgrounds with at least one parent with a college degree have often been raised. Their families have imbued in them a sense of self-importance, individual preference, choices, and control over their own lives, and they have had enough resources to exercise those personal decisions.

The researchers found that first-generation, low-income, and/or working-class students, on the other hand, were more often raised with *interdependent* social expectations (Stephens et al. 2012). They have had limited resources and fewer opportunities than their more affluent peers to exercise preferences and control. Interdependent students, according to the researchers, are affected by external conditions and the needs of others more often than they are calling the shots. The implications of the research are that first-generation college students may have deep-seated cultural and familial values fundamentally at odds with their professors' expectations (Stephens et al. 2012). That cultural divide could explain a misunderstanding—or misalignment of values—that causes frustration for faculty who wonder why students from underserved backgrounds are not taking hold of the opportunities they are offered. Students unaccustomed to

looking for openings and claiming their preferences are not likely to jump at the chance to join a research team, study abroad, apply to the honors program, or seek out a competitive grant. UR mentors may have to put in more deliberate effort when recruiting and supporting underserved students, rather than waiting for students to approach them or even to respond to generalized calls for undergraduate researchers.

Responses on the BSU student surveys to the question, "How did you learn about undergraduate research at BSU?" point to potential recruitment strategies that may help encourage underserved students to get involved in UR. The students reported learning about UR opportunities in multiple ways and often through several recruiting efforts. Students of color were most likely to report getting involved in UR after information sessions at BSU's Center for Multicultural Affairs or at a student club meeting. As UR director I held "lunch and learn" sessions (a practice the succeeding UR director has continued), and some faculty mentors hold regular office hours in the Center for Multicultural Affairs in an effort to meet students of color in a space that is familiar and comfortable. Presentations about UR opportunities at multicultural club meetings, such BSU's IAMSSTEM (International and Multicultural Students in STEM), Sister Scholars, Men Integrated in Brotherhood, and the Native American Cultural Association, intentionally inform students that research in all disciplines needs diverse perspectives and is open to any student with the interest and work ethic to participate, not just those who entered the university as honors students. Other BSU students from underserved groups said they were individually invited to join research teams by faculty mentors.

Because many college students have little or even incorrect understanding of what "undergraduate research" means, especially outside of laboratory sciences, recruiting of diverse students may also include informing them of the range of what scholarly work includes, with particularly interesting examples of current projects in different disciplines. Mindful of the research by Stephens et al. (2012) on the interdependent social norms of first-generation and working-class students, UR mentors and program administrators can draw direct connections between the skills and experiences gained through mentored scholarly work and the expectations of employers and graduate-school programs in various fields. When I give class presentations or lead student workshops on UR opportunities I usually begin with a "human thermometer" exercise in which I label one side of the room "on fire to do research" (hot) and the other "it would be a cold day in hell before I'd want to do research" (cold) and ask students to position themselves along the continuum according to their own sense of UR. Most students cluster on the cold side of the room, several more in the middle (because they say they do not know enough about it to be "hot" or "cold"), and, if I am lucky, one or two usually-experienced undergraduate researchers at the hot side of the room. After a few students share their reasons for their positions they take their seats again, and I begin sharing the benefits of UR according to research conducted by the Association of American Colleges and Universities (AAC&U) and Gallup, as well as the expectations of employers across various industries for college graduates to demonstrate a record of practicing skills such as oral and written communication, collaboration, problem-solving, and ethical decision-making (Hart Research Associates 2015). At the end of the session we "take the temperature" again, and almost to a student, they will have "warmed up" considerably to participation in UR. "What 'warmed you up' to research?" I have asked, and most responses have fit in one of two categories: students had experienced research as boring and/or overly demanding work that they disliked in previous "research" assignments, or they did not expect research to fit into their future goals. As one Education major put it, "I'm going to be a teacher. I'm not going to work in a lab. But I see what you mean about how teachers do

research to become better teachers." Connecting UR to students' interests and goals has been critical to broadening access to mentored research at BSU. With the majority of our students from groups traditionally underserved in higher education we have a particular mission to meet their needs for meaningful and achievable scholarly opportunities.

Inviting students from underserved groups into UR requires connecting directly with their interests and goals, making clear what mentored scholarly work offers them in terms of relationships, skills, and opportunities for learning, travel, and networking. Likewise, laying out realistic expectations and time commitments, explaining how students' time will be rewarded (such as through course credit that meets program requirements or through Work-Study hourly pay), and being open about the less exciting aspects of the work, help to build trust and set a balanced foundation. First-generation and low-income students often have more extensive job and home responsibilities than their peers with more financial resources. Students whose parents attended college also understand its differences from high school and its encompassing expectations and therefore may be more accepting of students' academic priorities; students from working-class backgrounds do not often have such approval. Wherever possible, creating flexible schedules that accommodate student job and home responsibilities can help retain students in UR.

UR mentors are in a unique position to talk with students about the trade-offs between work and academics and the choices they can make about time-management. The most frequent comment I hear from working-class students is that they do not have time to participate in UR and other high-impact practices. Moving more authentic scholarly work into the curriculum, such as through inquiry-based assignments and whole-class opportunities for students to present their results and/or publish online, breaks down that divide between students who can afford to take on extra- and co-curricular research experiences and those for whom anything beyond course requirements seems impossible. (See chapter 8 of this book for a full discussion of research embedded in the curriculum.) Especially for students who are bound for graduate school and/or who have deep interest in participating in more intensive/long-term scholarly work, making decisions about finances and time is both difficult and vital. Faculty mentors understand what students have to gain from working fewer hours and stepping back from family and home obligations in order to participate more fully in the pursuits, such as UR, that are most likely to bring longer-term success. What might be less evident are the intense pressures on many students to take as many shifts as they can to minimize their student-loan debt or to maintain their caregiver role in the family. A faculty mentor, listening with sensitivity and seeking creative solutions, may be the only person a student has to talk with about navigating competing demands.

Mentors seeking to support underserved students usually have multiple campus resources that can help—many of them outside of Academic Affairs. Campus diversity officers, Student Affairs staff focused on supporting multicultural students, Pride Center staff, and Disability Resources staff, among others, have expertise in creating hospitable, safe spaces for students with diverse identities and needs. Workshops on diversity and inclusion and trainings for creating LGBTQ "safe spaces" are examples of educational opportunities that help expand awareness of how the words we use, the approaches we take, and the biases we begin to examine affect ourselves and our students.

Bridge-Building between Academia and Home Life

The second theme derived from the literature and from survey research at BSU is that faculty mentors can support underserved students by helping to build bridges between academia

and students' home, family, and work responsibilities. The stories in the literature of students who are minorities on campus and/or who are first in their families to go to college include a common feeling of not quite belonging anywhere—feeling out of place among peers on campus and fearing betraying (or being perceived as betraying) family and friends at home (Gándara and Maxwell-Jolly 1999; Orbe 2004; Smith, Allen, and Danley 2007; Stephens et al. 2012). Students from underserved groups have described trying to negotiate the new expectations of academia while still meeting their obligations to loved ones and holding on to their cultural identities (Orbe 2004). Social Identity Theory (Tajfel 1981) and the Model of Multiple Dimensions of Identity (Jones and McEwen 2000) have offered explanations for the ways individuals' behaviors are influenced by their membership in identity groups. Both theories posit that social identities are powerful and that individuals form distinctions among in-group and out-group identities. People recognize clear differences among social/cultural groups and therefore respond to each of them in different ways, even when they identify with mutually-exclusive groups (Jones and McEwen 2000). The theories suggest that students from underserved groups who do not see overlap between their personal identities at home and at college would experience a profound internal struggle. They could naturally feel uncertain about whom they are and whom they desire to be, not seeing how to reconcile their divergent identities.

UR mentors of students from underserved groups can serve as a crucial connection between the world of academia and students' homes and neighborhoods. Students often seek mentors who share their recognizable identity traits (e.g., race/ethnicity, gender, sexual orientation) as "bridge" figures who can help them across the chasm of what is expected in two very different contexts. Kendricks et al. reported on the successes of a UR program in which faculty mentors "mirrored the diversity of the program participants" and their HBCU institution as a whole; the program organizers sought to match students with mentors of similar backgrounds (2013, 39). Campbell and Campbell (2007) found that while gender matches between students and faculty mentors showed no advantage, racial/ethnic matches were correlated with statistically significant, long-term gains for students, in terms of GPAs, graduation rates, and pursuit of graduate study. Their "robust" findings led the researchers to call for "an ethnically diverse faculty" to mentor ethnically diverse students (Campbell and Campbell 2007, 144).

Of course exact identity matches between students and mentors is impossible on a large scale, but recent research has encouraged communities of practice in which diverse groups of mentors work with diverse groups of students. Kobulnicky and Dale described a "community mentoring" model in which small groups of faculty and graduate students mentored teams of undergraduate researchers in "collaborative networks or constellations of mentors" that achieved positive outcomes, especially for students from underserved groups (2016, 17). They found that the collaborative approach to mentoring eliminated the potential problem of a mismatch between student and mentor, as students and mentors were not stuck with one another. Each student worked closely with each mentor on the team at one time or another, and they could seek more personalized guidance from any mentor(s) with whom they connected (Kobulnicky and Dale 2016). See Chapter 7 of this book for additional models of co-mentoring undergraduate researchers.

Other research on UR mentoring has shown, however, that an identity-match between students and faculty mentors is not essential to underserved students' success in UR. Faculty who intentionally practiced inclusive modes of mentoring, whether they were of similar backgrounds as their students or not, were seen by students in several studies as easing their

transition between home and school (Davis 2007; Ishiyama 2007; Jones et al. 2010; Locks and Gregerman 2008; Schwartz 2011). My research at BSU has similar findings. In the surveys of underserved students at BSU about their UR experiences, 98% said they were "satisfied" or "very satisfied" with the support they received from their faculty mentors. In open-response answers, several students credited their mentors with bridging a difficult divide between home and academia. "I was embarrassed to tell her I have a kid," a Black student who is a single mother wrote about her mentor. "But after I finally told her, it was no big deal. I swear she's like an auntie to my daughter now. She buys her birthday presents, and she always asks about her." The student went on to express appreciation for her mentor's understanding that she could not submit an abstract for a conference in another part of the country because she did not have overnight childcare for her daughter. "She told me about the Commonwealth [of Massachusetts] conference that I could go to for one day. THAT I could do." The mentor's interest in and accommodation for the student's child offered the student the assurance that she could conduct research and present her findings, even while parenting a young child and taking a full course load. The student's multiple identities as a mother, student, and researcher, among others, could coexist with guidance from a faculty mentor who understood the importance of each role.

Several BSU students expressed gratitude in survey responses for their mentors' explicit invitations for their family members to attend their campus-symposium presentations. A first-generation college student majoring in Social Work wrote enthusiastically about having her parents and siblings around her poster for the hour-long poster session, even though it was the last session of a 10-hour day and therefore thinly attended. "I hoped my family would like my mentor, and they did. He talked with them a long time and made us all feel comfortable."

A transgender student of color recounted the effect on his parents of meeting his research mentor—the first educator they had encountered who referred to their child by his preferred name and gender pronoun, something they themselves did not do. "I think they see me differently now because of [my professor]. It's like I'm suddenly okay because this professor thinks so." The faculty mentor showed the students' parents that their child was welcome and valued at the university, extending the possibility for the parents to shift perspective. In each of these examples, UR mentors were recognized by their students as helping to navigate between academia and home, all through conversations that allowed both places to coexist. Those seemingly small gestures—asking how family members were doing, inviting them to presentations, and engaging in conversation with the family—were noteworthy to students and brought welcome relief. Students who expressed nervousness or discomfort about the distance between their lives at the university and their identities and relationships at home also expressed pleasant surprise at how their mentors helped bridge the divide.

In a study conducted by Hurtado, Ruiz, and Guillermo-Wann (2011), they pointed to the Common Ingroup Identity Model (Dovidio et al. 2001) as an explanation for how such bridging of student identities occurs, through "a process of re-categorization where cooperative interaction between ingroup and outgroup members helps to create a new superordinate identity with which positive crossgroup interactions can be held" (Hurtado et al. 2011, 5). In other words, "cooperative interaction" between the student's UR mentor and family members may help students form a new identity in which academia and home can positively interact. "An important caveat" noted by the researchers is particularly relevant to consider when mentoring students from underserved groups: "racial minority groups need to maintain a salient subgroup identity in order to make the superordinate identity strong and stable" (Hurtado et al. 2011, 5). The new identity that students form in which academia and home/family/culture interact cannot come at

the expense of their foundational identities. To extend the metaphor, the new identity needs to be a strong, stable, two-way bridge between the students' home and academic groups.

Alleviating Minority Students' "Racial Battle Fatigue" and Isolation on Campus

Students of color often confront discrimination as part of their daily experience, especially on predominantly White college campuses (Fasching-Varner, Albert, Mitchell, and Allen 2015; Smith et al. 2007; Smith, Hung, and Franklin 2011; Smith, Yosso, and Solórzano 2011). To create an inclusive and equitable UR experience, faculty mentors have a critical role to play in alleviating "racial battle fatigue" and isolation of students of color. This third form of mentoring support for underserved students is based on decades-long research showing that students of color experience on a regular basis outright bigotry, denial of their experiences, and microaggressions, such as subtle, degrading assumptions about their abilities and interests (Pierce 1974; Smith, Hung, and Franklin 2011; Sue 2010). Such experiences negatively influence academic performance and need to be countered by faculty dedicated to equitable access to educational opportunities.

In noting how the persistent stress of living and working in an unwelcoming environment affects people of color in the U.S., and specifically African American college students, William A. Smith (2004) developed the theory of "racial battle fatigue" to explain a correspondence between people of color in the U.S. and soldiers' experiences in battle, namely in the fear that an attack could come from anywhere at any time, and in the exhaustion and chronic stress that can ensue. "Racial battle fatigue" refers to the myriad physiological, psychological, and emotional/behavioral responses to an accumulation of racial microaggressions (Smith, Hung, and Franklin 2011). Researchers at Pennsylvania State University demonstrated that chronic discrimination is a significant predictor of the psychological and physiological symptoms of Generalized Anxiety Disorder, and that African Americans and Afro Caribbeans living in the U.S. were significantly more likely to experience race-based discriminatory episodes than were Whites (Soto, Dawson-Andoh, and BeLue 2011). Discrimination at both the micro-level (indirect, covert, insinuating remarks and treatment) and macro-level (blatant prejudice) has been shown to negatively affect academic/work performance and psychological health (Okazaki 2009; Sue 2010).

People of color who excel in academia and the workplace have reported that "the microaggressions are not one-sided" (Jackson 2015, 3). They have been perceived by other people of color as sell-outs or "Uncle Tom" figures for the attention and praise they receive from (usually White) leaders/supervisors (Jackson). Jackson (2015) also noted that that praise can be a racial microaggression in and of itself, such as when a Black man is commended as a model to uphold because he is "articulate," not angry, and "not like other Black guys." For these reasons among others, students of color have expressed feeling isolated on campus, as they perceived biased assumptions and distancing behaviors from members of various groups, including those with which they identify.

My research at Bridgewater State University (BSU) suggests that faculty mentors can play a consequential role in helping to alleviate the isolation and racial battle fatigue of underrepresented minority students. Several students of color explicitly stated in survey responses that faculty of color were their primary sources of support. A Latino student working with a Latina mentor at (BSU) said in a survey response, "She gets it. Even though we are from different countries, we both know what it's like for people to think you're stupid because you speak with an accent. We joke in Spanish about it." A Black student working with a Black

mentor wrote, “You just know that he understands what it’s like to be a minority. You don’t even have to say it.”

After some of my conference presentations in the U.S. and Canada on this topic of supporting underserved students in UR, White faculty mentors have expressed to me their discomfort with talking about race and ethnicity, especially with students of color. Some said they assumed it would be impolite or presumptuous to discuss such matters with their students. “I’m not trained in diversity,” a faculty mentor said when he confessed to feeling uneasy and unprepared to respond when a Black student told him about experiencing microaggressions from members of his research lab group. A White professor at an HBCU told me, “I figure my role is to shut my mouth when it comes to race.” Another White male told me he’d “prefer not to talk about [race] at all,” but to focus only on the research. Among the problems of leaving discussions of race and racism to people of color is the reinforcement of White privilege (in this case, the luxury of White people to ignore a crisis that does not appear to affect them) and the apparent invalidation or minimizing of experiences of people of color, a microaggression in itself.

The Anti-Defamation League (ADL) (2017a) explained that such discomfort and fear on the part of educators, particularly those in majority groups, is common. The ADL has recommended self-reflection and professional development on issues of race, ethnicity, power, and privilege, and perhaps most importantly, educators’ willingness “to not only be uncomfortable but be a learner alongside their students” (2017a, para. 2). The ADL’s (2017b) resource, “Creating an Anti-Bias Learning Environment,” and Sue’s eight strategies for “Racial Dialogues in the Classroom” (2010, 250-254) can be adapted to co-curricular learning spaces, such as laboratories, studios, and faculty offices too.

Only 2 of 95 students from underserved groups who responded to Bridgewater State University (BSU) UR surveys said they were “dissatisfied” or “very dissatisfied” (one response in each category) with their relationship with their mentor. Even 2 explanations, however, inform this discussion of microaggressions, racial battle fatigue, and the need for UR mentors to be aware of and responsive to such matters. A gay Black male student majoring in the performing arts reported telling his UR mentor that he felt as if he “didn’t belong” in the majority-White and majority-female program and that it was difficult being one of a small minority in terms of race, gender, and sexual orientation. The student said he knew his mentor was trying to reassure him, but her response—“No, that’s not true! Everyone loves you!”—and the implication that he might be imagining slights, such as by suggesting he may be too sensitive, felt dismissive and intolerable. He said the discussion made him want to leave the program.

A BSU student who reported being “very dissatisfied” with his relationship with his mentor also identified himself as a Black man who was first in his family to attend college and who received a federal Pell grant. His statement about his mentor, “I feel she discriminated against me because I’m poor” was explained by stories of the mentor’s unfavorable comparison of the student to other undergraduate researchers in the lab group who regularly put in longer hours on a volunteer basis, including during the summer:

> I’m taking 19 credits and have 2 jobs to pay for school and still I’m there [in the lab] every week. I told her in the summer I can’t do research because I have to work and I don’t have a car. She always says the other students are more committed than me. After working in the lab for all these semesters that really hurts. If that’s how she feels I don’t want to do research anymore.

The faculty mentor's framing of the student's need to do paid work in addition to volunteer research as a lack of sufficient commitment to UR was seen as unsympathetic to the student's economic situation (paying his own way through school) and demeaning of the commitment he had indeed made (working weekly in the lab for several semesters). It could fit definitions of microaggressions as "subtle…put-downs" (Pierce 1970, as cited in Sue 2010, 24) and "brief, everyday exchanges that send denigrating messages to certain individuals because of their group membership" (Sue 2010, 24). As Sue explained, "The power of microaggressions is in their invisibility to the perpetrator," including a "well-intentioned professor" (2010, xv, 5).

In some studies in the literature (Davis 2007; Ishiyama 2007; Schwartz 2011), White mentors who were perceived by students of color as sincere listeners and empathizers, were said to help ease feelings of isolation and racial battle fatigue. Schwartz explained that UR mentors of students of color who provide "emotional output, listening, […] empathy, and […] advice" support students' sense of belonging even in a predominantly-White academic world (2011, 537). Some of the survey responses from BSU students upheld that idea. A Black student in the BSU study recounted her experience presenting her research at a national conference when she was the only person of color in the oral-presentation session. She said the other student-presenters on the panel and every member of the audience, including her mentor, were White, and she felt overwhelmed with nervousness. After the session, when the student apologized for feeling nervous, her mentor reassured her and actually brought up the student's experience of being the only person of color in the room. According to the student, her mentor said that if she (the mentor) had walked into a room where she was the only White person or the only woman, she would have been very nervous, even though she had given many conference presentations. "She said that my first presentation was a really hard one because I was the only minority student. I was so grateful I gave her a hug right then. I appreciated that so much!" Even a straightforward acknowledgment of a student's experience has been said to make a difference in easing stressful circumstances. Ignoring issues of race for the sake of politeness has not been shown to be helpful and can actually contribute to feelings of isolation.

Committing to a Long-Term Relationship with Student-Researchers and Making Oneself Accessible and Open to their Needs

The fourth theme I have identified in researching UR mentoring support for underserved students is the need for faculty to make long-term commitments to working with student-researchers when possible and to be accessible and open to student needs. Research from the literature has shown the need for and value of committing to long-term relationships when mentoring students from underserved groups (Campbell and Campbell 2007; Carpi et al. 2016; Locks and Gregerman 2008). Especially for students who have experienced a high degree of stress and chaos in their lives, having a sense of security in a supportive relationship with a mentor can be transformational. Financial insecurity brings a host of other stressors. For example, low-income students have experienced more housing moves (and therefore more school and daycare moves) on average than those from middle- and upper-class families (Stephens et al. 2012). According to research by Stephens et al. (2012) on the interdependent social norms of first-generation, working-class students, such students often grew up with things happening *to* them, as opposed to choosing and fulfilling their own preferences. The mindset that may develop is that nothing can be counted on completely. The researchers stated that students who think they see that familiar pattern coming have been known to abandon what they are doing—whether that means quitting a research group or leaving college altogether.

Survey responses and direct examples from underserved students at BSU affirmed this point, indicating the importance of long-term trust-building and the need for steadfast support from UR mentors. In Spring 2016 two BSU students who in the preceding semester had been active in and enthusiastic about their work as research apprentices in the SOAR program (for students from underserved groups), stopped showing up to SOAR meetings and were not recording any hours worked. When I asked them about continuing the work, both indicated they had been dropped by their respective mentors. One Black male student's faculty mentor was on sabbatical that semester, which she had communicated to the student but did not explain to him what a sabbatical is, when she would be back, and what, if anything, the student could do in her absence (such as work with a different professor in the department). Her SOAR student said he assumed he had done a poor job and was not wanted anymore.

The same conclusion was reached by a Black female transfer student whose mentor got so overextended at the end of the semester that she missed a meeting with the student and did not reply to a follow-up email. That was all it took for the student to conclude she was being cast off—much to the surprise of her mentor, as it turned out. The student previously had been so enthusiastic about social-science research that she had taken the full CITI (Collaborative Institutional Training Initiative) Human Subjects Research training at her mentor's suggestion. She even recalled that her mentor had said she was pleased with and grateful for her contributions to the study, but when she lost contact for a few weeks she seemed to have lost confidence. Other students who joined SOAR and did not hear back from a mentor within a few days of an initial email have tended to fade away from the program, suggesting they thought the faculty member did not want to work with them. My colleagues and I have needed to provide multiple assurances to bring them back.

Faculty mentors may be able to prevent such misunderstandings with communication about their workload and priorities and with unambiguous statements at the outset of the relationship about what students can expect (e.g., a break in the research work in the last two weeks of the semester) and what to do when in doubt (e.g., send a text message if they do not get an email reply). BSU student survey responses gave additional ideas for demonstrating long-term commitment, especially to students whose life experiences have not led them to presume their mentor's dependability. One BSU student expressed excitement about plans in the subsequent academic year to work on a research question that was of personal interest to him as an immigrant to the U.S. The topic was only peripherally related to his professor's scholarship, but the professor indicated they would work toward it over the course of their first two semesters together; the student would develop knowledge and skills in the areas of the professor's research, and the professor would read and think about potential junctures between her research group's current focus and the student's area of interest. In making that plan, the mentor communicated both a commitment to working with the student beyond the immediate academic year and a valuing of the student's experience as an immigrant and his desire to bring an academic lens to it.

Several underrepresented minority students involved in UR at BSU used the language of familial relationships to explain their mentors' commitment to them. Some referred to their lab group or team of fellow undergraduate researchers explicitly as "family"; faculty mentors were said to be "like a dad" or "mom" or even older sibling to their students, always in reference to the mentors' evident "love" and dependability. Such responses were reminiscent of a successful STEM-retention program (Benjamin Banneker Scholars) developed at an HBCU, in which faculty mentors approached their roles based on Guiffrida's (2005) "Othermothering" framework (Kendricks et al. 2013). The program developers explained that "othermothering" refers to a

practice during the era of slavery in the U.S. of women parenting other women's children when those children were separated from their mothers, often because they were sold to different masters; "othermothering" underlies the notion that "it takes a village to raise a child" (Collins 2000 cited in Kendricks et al. 2013). In terms of mentoring students from underserved groups, "othermothering" refers to "culturally competent, caring teachers […] willing to go 'beyond the call of duty'" (Kendricks et al. 2013, 39).

> Mentors helped mentees find internships, additional scholarships, books, calculators and lab materials, resolved roommate conflicts, and arranged travel to and from home and gas money. Mentors also provided a place for scholars at the dinner table during holidays as well as clothes for formal conferences and other events, visited scholars' homes to talk to parents, talked with scholars on the phone or by video during the summer and/or holiday breaks, and at all hours of the night, and all of this in addition to the typical advising duties of each mentor. (Kendricks et al. 2013, 40)

While many faculty mentors would find such a role unappealing and perhaps even unprofessional in its collapsing of traditional student-professor boundaries, the "othermothering" model offers a useful starting point for understanding some of the needs of students of color and first-generation and low-income students.

Interestingly, students across demographic groups, including White students with a family legacy of higher education, have expressed wanting and appreciating UR mentors who are more like a parent or friend than a traditional college professor in terms of availability and responsiveness (Falconer and Holcomb 2008; Gafney 2005; Ishiyama 2007; Mekolichick and Bellamy 2012; Mekolichick and Gibbs 2012; Shellito et al. 2001). An early guidebook on mentoring UR in sciences and engineering, published by the National Academy of Sciences (1997), was titled *Adviser, teacher, role model, friend* (emphasis added). Gafney reported that students saw their UR mentors as "always there, evenings and weekends" (2005, 53) and that the most important quality in a mentor was "readily available" (54). Shellito et al. found that faculty time is "the most important factor in providing a positive undergraduate research experience" (2001, 462). These characteristics of time-intensive, readily-available, close, and friendly mentoring may be even more keenly valued by students from underserved groups (Carpi et al. 2016; Kendricks et al. 2013; Schwartz 2011).

For UR mentors who, like me, wince at being called "mom" by students or, like my colleague, would say to students who want her to be available around the clock, "No, thank you; I have a life," there are data to indicate that a more measured approach to accessibility and openness can also promote student success, including for students from underserved groups. Numerous successful programs to increase underrepresented-minority participation in STEM reported on by Carpi et al. (2016) do not go as far as "othermothering." Other researchers have found that the factor in the mentor relationship most significantly correlated with success for a diversity of students is the *length* of time invested in the relationship, not the intensiveness of that time (Russell, Hancock and McCullough 2007; Thiry, Weston, Laursen, and Hunter 2012).

I was intrigued to discover a few BSU survey responses that suggested that not all students crave close attention from mentors, and some chafe under too much of it. Five (of 95) students brought up the immediacy of texting and social media as a drawback in their mentored UR experience. Two students mentioned being "friended" by mentors on Facebook and feeling unsure about how to respond, as they did not want to offend their mentors but also wanted to keep their personal lives separate from their research work. Two students who both identified themselves as female, White, first-generation, and low-income expressed discomfort with what

could be termed UR mentors' "othermothering." One explained, "My laptop was broken and I couldn't afford a new one, but I didn't want to tell [my mentor] because I was afraid she would buy one for me. She did that for someone else in our lab last year. I just don't want to feel obligated to her like that. I'd rather borrow from friends until I can get mine fixed." The other student admitted that while it was often practical to be able to text messages with her mentor, she also wished she could sometimes escape it: "When she texts on a Sunday I sometimes pretend like I didn't get her message until that night. It's like she expects our whole life to be research."

A middle ground of reasonable availability can be established by mentors. Problems have arisen when students cannot track down their mentors or feel constrained by needing to request appointments days in advance—not when faculty are reasonably and predictably available and communicate openness to student ideas and needs. For the students from underserved groups involved in UR at BSU, the main complaint among the very few about mentors was their lack of responsiveness for several days at a time. In my experience as director of the UR program, I perceived that students from underserved groups were more quick to assume that they had failed or been rejected from the research group than they were to demand constant attention from their faculty mentors.

Constant availability and "othermothering" are neither realistic nor sustainable in most faculty member's workloads and outside of specially supported programs (such as the Benjamin Banneker Scholars Program described by Kendricks et al. 2013). That said, the bases of "othermothering" degrees of availability—faculty care for students as whole persons and faculty responsibility for guiding students in the norms and expectations of academia—can (and do) form the foundation of less intensive, yet successful mentoring. In the BSU surveys, the examples students provided of their mentors' care and accessibility did not appear to be predicated on constancy or exhaustive devotion but on much simpler attentiveness to student needs at critical junctures: when complicated equipment needs to be used; after disappointing, frustrating, or inconclusive results; before a conference presentation; etc.

Maintaining a once-a-week time to meet with student-researchers has been shown to be a necessary and reasonable degree of availability (Falconer and Holcomb 2008; Hunter, Laursen, and Seymour 2007). Students from underserved groups may be less likely than their peers to set up meetings in advance and seek out professors when they need guidance (Stephens et al. 2012). Providing clear information about where and when one can be located for an in-person meeting or contacted without apprehension for a consultation by phone is invaluable, especially for students who are still building confidence about their place in the academy.

While a reliable weekly meeting time is important, so is some flexibility about it. Two students in different research groups at BSU expressed stress about strictly mandatory meetings with their mentors and peers. When a student new to a lab group felt he needed to travel to downtown Boston for a cousin's immigration hearing, he ended up fired from the lab for missing a mandatory meeting without contacting his mentor ahead of time. The student had made an unrealistic assumption about timing, hoping he could get back to campus for his team's meeting. With no experience taking public transportation from downtown to campus nearly 30 miles away, his mistake was understandable. But the compounding factor was his embarrassment about needing to go to the hearing for his cousin. As he explained it, he feared his UR mentor would not understand his family's expectation for him to be there to translate, and his family would not value his commitment to something as ineffable as "research." He felt intensely two mutually-exclusive demands that afternoon, and it was impossible to meet both. It took him a day to work up the courage to apologize to his mentor, and that was considered too late.

A near opposite of that case occurred the same semester at BSU, with a team of SOAR undergraduate researchers who met weekly to review journal articles for an extensive literature review. One of the students, an English-Language Learner who had been struggling with reading research articles, simply stopped showing up. After leaving phone, text, and email messages for the student, his mentor contacted me as the UR director for advice, expressing his concern that the student may have been in trouble. I could not reach the student either. Office of Residence Life staff were only allowed to tell me that the student was still living on campus and that they would carry out a wellness check. When the student finally ran into his mentor some weeks later, he revealed his worry that he had been dragging down the group as a slower reader, and he said he had been too ashamed to talk about it. He thought he could quietly disappear and add a shift at his paid job instead of continuing with research. The faculty mentor's persistence and demonstration of care, however, brought him back. Rather than being taught a hard lesson about the consequences of not showing up, the student learned about trusting his mentor and about the forgiveness available to him as he tried to find his way in college.

Rather than assume the student was lazy or irresponsible, his mentor sought to learn what the problem was and then addressed it directly. Examining assumptions about what is working and not working for student-researchers is part of tuning into and addressing their needs. A barrier for low-income students in presenting their work at national conferences did not occur to me until I heard directly from a student about the problem. At BSU, students accepted to present at regional and national conferences receive travel grants from the Office of Undergraduate Research that cover 100% of airfare, lodging, registration, and $35 *per diems*. Airfare, lodging, and registration are prepaid directly by the university so that students do not have to put those expenses on credit cards and wait for reimbursement, which we know from years of experience would be an insurmountable obstacle for many students. *Per diems*, however, have been paid by check 2-3 weeks after the students' return from the conference, through the university reimbursement process. Before the American Chemical Society (ACS) national conference a few years ago I learned from a student who would be presenting there that she was anxious about paying for food in an expensive city; her bank account balance would not cover the costs, so she was trying to figure out what kinds of food would be safe to pack for a 6-hour flight to California and whether there would be refrigeration in the hotel room. After working with staff in Accounting to create an option for pre-payment of *per diems*, I responded to the student, as well as reached out to other students traveling to ACS and other conferences, to let them know about the new option of accessing funds for *per diems* before they left home. Dozens of students who have since taken that option have expressed appreciation, explicitly saying they had previously planned to bring food in their luggage and not go out to eat in the conference city. In listening for and responding to student needs mentors can ease student stress and help facilitate their full participation in UR and other high-impact practices.

Advocating for and Sharing Power with Students, Especially through Professional Socialization

Faculty advocacy and power-sharing with undergraduate researchers is the fifth and final theme regarding mentoring support for underserved students that emerged from my research. Shore's (2005) review of UR mentoring practices indicated that successful mentors have approached their collaborations with student-researchers as they would those with a junior colleague—someone who is less experienced and in need of guidance but is nonetheless considered an equal. Namely, power-sharing mentors would ensure that student-researchers

would have a sense of ownership in the project, as that level of investment makes the experience of research transformative for students (Laursen et al. 2010; Malachowski 1996).

Such a method of mentoring that shares the decision-making power and the benefits of research with students can manifest in several different ways. In the beginning stages of scholarly work, mentors can show students how their assigned tasks, even when mundane or repetitive, relate to the larger project goals and are crucial to the outcomes. Students in reciprocal relationships with mentors would be made to feel welcome throughout the process of research to provide suggestions and feedback about the work. Students would be listened to with patience and openness to their questions, concerns, and ideas. Through such colleague-like relationships, students become more autonomous as they are given ownership of specific tasks/aspects of the work. Finally, students would be able to engage in work that not only advances their mentors' scholarly agendas but also helps them clarify and achieve their own goals (Benson 2002; Craig 1999, Mabrouk and Peters 2000; Merkel and Baker 2002; NAS 1997; Shellito et al. 2001; Shore 2005).

Allowing for and supporting student investment in a mentored research opportunity promotes shared responsibility as well as shared power (Gonzàlez 2006). Rather than simply giving advice and dispensing their knowledge, Gonzàlez found that effective mentors share power with students and advocate for their needs and goals. In an early publication on UR mentoring, researchers at the National Academy of Sciences (1997) urged faculty mentors to resist holding their power over undergraduates. Instead, UR mentors were encouraged to ask students for feedback on their mentoring and to use that feedback to make changes to their practices and research environments (Gray 2000; NAS 1997; Shore 2005).

Advocacy and power-sharing may be most vital for mentors working with underserved students. Davis (2007) critiqued the individualistic approaches that often dominate academia and encouraged faculty instead to adopt equitable, collaborative attitudes, especially when working with students of color. By intentionally including diverse voices and experiences, faculty not only promote the advancement of underserved students but also gain rich perspectives for their own scholarship, according to Davis.

For students to become invested in the scholarly process and responsible for their role in the outcomes, UR mentors can foster an environment that allows students to develop professionally. One of the most valuable ways that UR mentors have supported students' professional development is through providing networking opportunities by introducing students to colleagues in the field, whether they are on the same campus or working in another part of the world. Several researchers have written about the value to students of accompanying them to professional conferences and making key introductions (Mabrouk 2009; Mabrouk and Peters 2000; NAS 1997; Shore 2005). Mabrouk (2009) found that students attending a conference got as much or more out of informal discussions facilitated by their mentors than the conference presentations. Students reported that they made more connections for jobs and graduate/professional school through networking with the help of their mentors than through presenting their research.

Professional socialization provided by a faculty mentor has been shown to be even more significant for underrepresented minority students and first-generation students. First-generation students reported highly valuing having a mentor who is an expert in their field and who could therefore help them make connections to other well respected scholars (Ishiyama 2007; Mekolichick and Bellamy 2012; Mekolichick and Gibbs 2012). They especially appreciated being introduced to professors who work in programs to which students plan to apply for

graduate school. Faculty mentors can provide critical access to professional prospects that are otherwise very difficult to obtain for students without family or friends with experience in higher education. Students have suggested that their mentors also helped them navigate the unwritten rules and norms of the profession (Campbell and Campbell 2007; Davis 2007), everything from what to wear for a conference presentation to how to respond to a question they cannot answer, to how to narrow down the list of potential graduate programs.

My survey research at BSU elicited some additional ideas for professional socialization. Two mentors of underserved students at BSU have taken their students to lunch at the faculty/staff dining room to practice having a "working lunch" with employers and colleagues. The dining room is essentially an on-campus restaurant, with wait staff, table linens, and the bill brought to the table. As a first-generation student and Pell-grant recipient myself, I keenly recall the alarm I felt the first time, at age 18, that I went to a restaurant where the bill was handled at the table, so quietly paid by my host that I had not realized what took place. As we walked out of the restaurant after dinner I was in a state of panic, believing we had "dined and ditched" because we did not stop at a cash register to pay. When I spoke up about the need to go back to pay, my dining companions laughed in disbelief. I would have been grateful for such an opportunity to be walked through the process by a trusted professor, especially with the added guidance about discussing work and making a positive, professional impression while eating!

Similarly, BSU students with no experience of air travel have expressed intense anxiety about *getting to* a conference, overshadowing their additional nervousness about presenting to experts in the field. Meeting with faculty mentors ahead of time about what to expect and how to prepare for each stage of travel and participation in the conference has gone a long way to ease students' fears. Once in traveling to the National Conference on Undergraduate Research (NCUR) with a group of about 40 BSU students, I was dismayed that several students had to throw away bottles of contact lens solution, shampoo, and other toiletries at the security checkpoint. Because they never travel through airports they had not taken note of the rules about liquids in carry-on bags. For subsequent NCUR trips I made sure to inform students ahead of time about as many travel guidelines as feasible. Sharing information is a way of sharing power, and easing students' pathways into professional experiences helps them take full advantage of such opportunities.

Conclusion

UR mentors making intentional efforts in evidence-based practices can support all students' participation and success in research. This chapter has identified particular mentoring needs of underserved students participating in UR, as determined through a narrative review of the literature, theories of identity formation, and surveys of student-researchers at Bridgewater State University from historically underserved groups. As the research indicates, underserved students are more successful in research when mentors provide heightened attentiveness to empathy, emotional output, and long-term investment in the relationship. Such practices of successful mentors not only improve the quality of the research conducted by undergraduate students, but also their cognitive and socio-emotional growth, communication skills, enjoyment of the discipline, and persistence to graduation. Through such intentional focus on inclusive mentoring practices, UR mentors and program administrators may be able to broaden participation in research and support the success of underserved students.

Efforts to broaden participation in UR benefit all students—those from advantaged backgrounds as well as students from historically underserved groups—as working in diverse cohorts produces positive outcomes for all scholars. The work also offers gains for faculty,

whose scholarship benefits from diverse perspectives, and who often express deep satisfaction in working closely with the next generation of scholars. And it improves institutions of higher education, which can become more effective and equitable for all students by closing the gap in access to high-impact opportunities such as UR (McNair, Albertine, Cooper, McDonald, and Major 2016; O'Donnell, Botelho, Brown, González, and Head 2015).

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