

## HOW WE TEACH | *Generalizable Education Research*

# Knowledge gains in a professional development workshop on diversity, equity, inclusion, and implicit bias in academia

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<sup>1</sup>Department of Physiology, Louisiana State University School of Medicine, New Orleans, Louisiana; <sup>2</sup>Diversity and Community Engagement, Department of Medicine, Louisiana State University School of Medicine, New Orleans, Louisiana; <sup>3</sup>Department of Genetics, Louisiana State University School of Medicine, New Orleans, Louisiana; <sup>4</sup>Department of Cell Biology and Anatomy, Louisiana State University School of Medicine, New Orleans, Louisiana; and <sup>5</sup>Center for Interprofessional Education and Collaborative Practice, Louisiana State University School of Medicine, New Orleans, Louisiana

Submitted 2 December 2019; accepted in final form 16 April 2020

**Harrison-Bernard LM, Augustus-Wallace AC, Souza-Smith FM, Tsien F, Casey GP, Gunaldo TP.** Knowledge gains in a professional development workshop on diversity, equity, inclusion, and implicit bias in academia. *Adv Physiol Educ* 44: 286–294, 2020; doi:10.1152/advan.00164.2019.—As literature indicates, historic racism and implicit bias throughout academia have been profound metrics leading to a lack of diversity, as related to people from underrepresented groups according to race and ethnicity, among biomedical sciences graduate students in U.S. universities. Recognizing such challenges, a team of biomedical scientists and inclusivity educators developed and implemented a pilot training program within an academic health sciences center as an initial step to educate faculty and staff regarding their roles in the promotion of an inclusive academic environment, receptive to all students, including underrepresented students. The 3-h workshop included didactic modules, videos, teaching modules, and active attendee participation. Faculty and staff were presented common terminology and ways to promote the development of an inclusive and diverse academic workforce. Compared with pre-workshop, post-workshop survey results indicated a statistically significant improvement in attendee knowledge of correctly identifying definitions of “implicit bias,” “status leveling,” “color-blind racial attitudes,” “tokenism,” and “failure to differentiate.” Additionally, by the end of the workshop, participants had a statistically significant increase in self-perceptions regarding the importance of improving diversity and recognizing biases and stereotypes in graduate education, knowing what to say when interacting with people from different cultures, and the ability to acknowledge bias when mentoring students from groups underrepresented in the biomedical field. This preliminary initiative was successful in the introduction of faculty and staff to the importance of fostering an inclusive academic environment and thereby developing a diverse workforce.

graduate faculty; Kirkpatrick; stereotype; unconscious bias; underrepresented

## INTRODUCTION

In the broadest sense, diversity includes important and interrelated dimensions of human identity, such as race, ethnicity, color, gender, socio-economic status, nationality, citi-

zenship, education, geographic origin, religion, sexual orientation, ability, age, political beliefs, and or other ideologies. Diversity is lacking in biomedical science student graduates in U.S. universities (26). Individuals from groups underrepresented in the biomedical sciences encompass only 10% of doctorate degrees earned in the U.S (16), and 7% at the Louisiana State University Health Sciences Center (LSUHSC) School of Graduate Studies, New Orleans campus. These low rates of degrees earned are reflective of structural racism, as well as implicit biased, noninclusive academic climates that students from underrepresented backgrounds tend to encounter, and thereby impede their academic success.

In 1987, Wharton (27) suggested achieving diversity may well be the greatest challenge to those who would provide leadership in teaching, research, and service across the whole spectrum of the health sciences. Thirty years later, Wharton's thoughts are still applicable. Many science, technology, engineering, and math faculty avoid engaging in the topics of diversity, equity, and inclusion, often hesitating to participate due to their self-perceived lack of knowledge or training (9). However, graduate faculty mentors have a major influence on shaping student skills, attitudes, and careers. Given the daily personal interactions faculty have with students, Killpack and Melón (10) suggest individual educators have the opportunity and responsibility to improve retention of diverse students. Academic institutions of higher learning have a responsibility to educate and promote behaviors that are conducive to a positive inclusive educational environment. The goal of this study was to support faculty and staff in their efforts to improve entry, retention, and success of a diverse student body through an educational workshop.

**Literature review.** Research has revealed that stereotypes can impede the participation and advancement of individuals from groups underrepresented in academia, especially in science (18). For example, stereotype threat reduces test performance, which can lead to failure in academic programs (22). Everyone carries hidden biases from exposure to cultural attitudes about age, gender, race, ethnicity, religion, social class, sexuality, disability status, and nationality, which play a major role in establishing individual implicit bias (20). These unconscious perceptions govern many important decisions and

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can have profound effects on personal and professional lives. There is strong evidence that the challenges we face in cultural competency and embracement of diversity in academia are rooted deeply in human behavior to sustain life by excluding or even ostracizing perceived threats to an individual's group (6, 13).

Implicit biases, hidden biases, or unconscious biases about social groups are learned at an early age. They develop and are established throughout our lifetime and can create added obstacles for individuals from groups underrepresented in biomedical sciences entering graduate programs. Banaji and Greenwald (2) used the term "blind spot" for the portion of the mind that houses hidden biases that contain bits of knowledge about social groups. They coined the term "implicit bias," which has received support and criticism among the psychological community. Regardless of the accepted definition, there is a need for training in recognizing implicit biases and how subconscious feelings can lead individuals to stereotype people based on race, ethnicity, gender, or sexual orientation. Nivet (17) proposed a widespread understanding that diversity and inclusivity are broadly and fundamentally relevant to institutions and societal system, and institutions that wish to achieve excellence must integrate diversity and inclusion into their core workings.

Academia has demonstrated a commitment to educating health professional students about the importance of becoming culturally aware of diverse populations through the development of accreditation standards and respective curricula (12). However, DeLisa et al. (4) proposed more training is needed in cultural awareness for medical students, residents, and physicians. It is important to note, training alone may not change faculty, staff, or learner behaviors, but a more diverse and inclusive environment may enhance awareness and willingness to learn. Therefore, it is important to expand educational training efforts for faculty and staff, as their knowledge, perspectives, and behaviors have the potential to impact student recruitment, training, mentoring, and retention. A literature review of the effects of implicit bias and diversity workshops for biomedical science faculty and staff for creating an inclusive academic environment for graduate students revealed a paucity of published studies.

**Background.** To promote the development of a more diverse biomedical workforce, the authors submitted a grant application that would support the educational training of students from underrepresented backgrounds for graduate biomedical education. The grant was funded through the National Institute of Health (NIH) proposal for a postbaccalaureate research education training program (PREP). The purpose of the NIH PREP grant is to enhance the acceptance, retention, and completion of Doctor of Philosophy (PhD) degrees in the biomedical sciences. The year-long program supports participation of the postbaccalaureates in conducting individual research projects, with mentoring provided by faculty in the schools of graduate studies, medicine, and public health. The educational workshop was designed to 1) impart knowledge to the faculty and staff who would interface with the incoming PREP scholars; 2) be included as an activity within the NIH PREP proposal; and 3) be based on training workshops (Table 1) attended by the developers for faculty and staff at LSUHSC-New Orleans (LSUHSC-NO).

Table 1. *Foundational programs attended by the facilitators that foster the development of the workshop*

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Association of American Medical Colleges (AAMC) Group on Diversity and Inclusion Meeting                                                                                                                                                                                                                        |
| <i>Blind Spot: Hidden Biases of Good People</i> , by Banaji and Greenwald (2)                                                                                                                                                                                                                                   |
| <i>Courageous Conversations About Race: A Field Guide for Achieving Equity in Schools</i> , by Glenn E. Singleton and Curtis W. Linton (23)                                                                                                                                                                     |
| Unconscious Bias Resources for Healthcare Professionals, in partnership with AAMC, by Cook Ross, Inc., at <a href="https://www.aamc.org/what-we-do/mission-areas/diversity-inclusion/unconscious-bias-training">https://www.aamc.org/what-we-do/mission-areas/diversity-inclusion/unconscious-bias-training</a> |
| <i>Everyday Bias: Identifying and Navigating Unconscious Judgments in Our Daily Lives</i> , by Howard J. Ross (20)                                                                                                                                                                                              |
| Fair Play video game by Christine M. Pribbenow, Molly Carnes, Percy Brown, Jr., at the University of Wisconsin, at <a href="https://fairplaygame.org/">https://fairplaygame.org/</a>                                                                                                                            |
| National Center for Education Statistics, at <a href="https://nces.ed.gov/">https://nces.ed.gov/</a>                                                                                                                                                                                                            |
| Out Alliance Safe Zone Program, at <a href="https://outalliance.org/">https://outalliance.org/</a>                                                                                                                                                                                                              |
| Project Implicit, at <a href="https://www.projectimplicit.net/">https://www.projectimplicit.net/</a>                                                                                                                                                                                                            |
| Racial Equity Institute Workshop at <a href="https://www.racialequityinstitute.com/">https://www.racialequityinstitute.com/</a>                                                                                                                                                                                 |

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The purpose of the study was to impart awareness, knowledge, and self-perceptions to participants related to developing an inclusive work environment at LSUHSC-NO, including students from underrepresented backgrounds. This paper describes the design, implementation, and evaluation of a professional development workshop on diversity, equity, inclusion, and implicit bias for faculty and staff. The objectives of the workshop included: 1) educate attendees on commonly used terminology when discussing inclusive environments; and 2) enable participants to gain information about the role that implicit bias plays in deterring the establishment of a culturally aware, inclusive, equitable, and diverse academic workforce, and thereby begin to provide the foundation to improve the mentoring and institutional environment for students from diverse backgrounds. Our goal was to increase awareness and knowledge surrounding the importance of having a diverse student body at LSUHSC-NO.

To begin the implementation of this concept at LSUHSC-NO, we incorporated education of LSUHSC faculty and staff regarding the value of diversity and inclusivity, which was intended to provide the foundation that may improve mentoring of biomedical graduate students from underrepresented backgrounds, as well as increase appreciation for the embracement of cultural diversity.

## METHODS

The development team distributed e-mail invitations to LSUHSC-NO faculty and staff, who had the potential of interacting with biomedical graduate students. Additionally, workshop digital announcements were displayed in multiple areas throughout campus for 1 mo before each workshop. Attendees were advised to register for the workshops in advance, with a maximum attendance set at 20; however, the maximum number of attendees was 14, and the minimum number of attendees was 6. Attendees were provided an electronic link to a voluntary survey pre- and post-workshop. Exempt approval (IRB no. 9973, December 18, 2017) was received from the LSUHSC-NO Institutional Review Board.

**Participants.** The original target audience for the workshop was basic science research faculty who were interested in mentoring the postbaccalaureate students. The research team expanded participant registration to include faculty and staff from the entire institution due to expressed interest. University staff members included those who interact with students and employees in many capacities throughout campus, including student housing, food service, parking services,

human resources, and student wellness. In addition, school administrators participated in the workshops, including associate deans and program directors. Fifty-five faculty and staff attended six workshops.

**Faculty facilitators.** Facilitators at each workshop included at least five faculty members, which encompassed a diverse group of individuals who are knowledgeable in the fields of education, diversity, equity, cultural awareness, LGBTQ (lesbian, gay, bisexual, transgender, queer) Safe Zone training, health disparities, inclusivity, and community engagement (Table 1). Collectively, they have experience as directors and leaders related to diversity at the institutional, state, and national level. Thus, implementing a multifacilitator approach with wide-ranging fields of experiences, as well as being themselves from multiple ethnic and cultural backgrounds, inclusive of diverse educational discipline experiences and trainings, provided unique strengths to these workshops. At the beginning of the workshop, the facilitators presented eight suggestions for creating a safe space (modified from Wexner Medical Center). Most importantly, the attendees were encouraged to maintain confidentiality, refrain from making assumptions about what others think or mean, and avoid derogatory or sarcastic comments. The attendees sat around a U-shaped table to foster communication across all groups. The facilitators suggested that attendees sit next to people that they did not know to reduce the hindrance of openly sharing during the small-group activities.

**Workshop.** A total of six workshops were offered in January, April, May, and November 2018. The 3-h workshops included a didactic presentation, videos, teaching modules, an active-learning activity of matching of vocabulary words, brainstorming, and discussions. The workshop alternated between didactic modules and active participation to allow for opportunities for sharing of personal experiences and knowledge. Open discussions of the facilitators and participants were encouraged throughout the workshop. Active engagement among participants and facilitators during the workshop was an important component, as implicit prejudice and stereotypes may be effectively changed through affective processes (4).

The workshop began with an oral presentation describing the purpose and was followed by presenting numerical data that demonstrated the racial and ethnic disparities in advanced degrees earned and tenured professors in the biological and biomedical sciences nationwide (15). Following facilitator and attendee introductions (15 min), time was allotted to complete a voluntary online survey and multiple-choice definition test (Table 2) developed specifically for the workshop (10 min). The oral presentation continued with an overview of the importance of creating a respectful atmosphere with ground rules to establish a safe space for constructive and progressive discussion. A video clip demonstrating “a life of privilege” was played, which included topics such as race, ethnicity, gender, LGBTQ, and socioeconomic status (1). A discussion of the video followed wherein the attendees answered the following questions: 1) “What is your first impression of the video?” and 2) “How did it make you feel?” (15 min). An attendee group-matching exercise of terms and definitions was the next event (Table 2; 20 min). All of the terms included in the matching exercise were also included in the pre- and post-multiple-choice tests. Each attendee and facilitator was handed a term and asked to locate the correct definition among individual papers placed on a tabletop. Attendees read aloud the terms and definitions, and facilitators encouraged discussion. A group brainstorming activity followed. The attendees were divided into small groups of three attendees and given a large blank paper and marker and asked to answer one of the following three questions (25 min): 1) “What is the importance of having a diverse workforce?”; 2) “What are stereotypes? Give examples”; and 3) “What are unconscious, implicit biases?” The large papers were mounted in the room, and one member of each small group shared his/her findings with the entire group. Facilitators encouraged further discussions of these topics. The oral presentation continued with information on the following topics: 1) importance of a diverse workforce, 2) practice of inclusion, 3) how

stereotypes contribute to implicit bias, 4) determination of one’s implicit bias, and 5) importance of cultural competency (15 min). Following a 15-min break, members of the small groups brainstormed ideas related to the following question (30 min): “What biases have you witnessed or experienced regarding education or training?” and wrote the examples on a large blank paper to share with the entire group. Facilitators also encouraged further discussions of these topics in large groups. The oral presentation continued with information on how to become more aware of unconscious biases and evidence-based strategies to foster changes in behavior (30 min). The workshop concluded with participants voluntarily completing a postsurvey (15 min).

This workshop highlighted issues that obstruct diversity in the academic environment and provided strategies for mindfulness. Participants were encouraged in the following ways: 1) to explore critically their own perceptions and prejudices about diversity; 2) to be bold and explore outside their comfort zone in communicating with others of diverse backgrounds; and 3) to avoid assumptions of individuals based on their group membership and treat them as individuals by asking nonjudgmental questions. Introspection, courage, and inquisitiveness are the key points for individuals to create diverse and inclusive environments.

**Survey.** The presurvey included a total of 22 questions. Ten questions collected attendee anonymous identifiers, demographic information, including job position, age, gender, race, and exposure to previous diversity training. There were 12 multiple-choice definition questions. The definitions were created based on recurrent common themes used in the foundational resources noted in Table 1. The terms and definitions are included in Table 2. The postsurvey included a total of 43 questions: 3 anonymous identifiers to allow pairing of pre- and postsurvey responses, 12 multiple-choice definition questions, 10 retrospective self-perception of knowledge and behaviors statements related to diversity and unconscious bias (Table 3), 7 workshop evaluation statements, and 4 open-ended questions (Table 4). The four open-ended questions included, “What is the single most important concept that you learned today?”; “What were the strengths of the presentation?”; “What could make this presentation better?”; and “other comments.” The self-perception of knowledge and behaviors statements and the workshop evaluation statements were scored using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, or 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent).

**Evaluation.** A popular approach to the evaluation of training is Kirkpatrick’s evaluation model (11), in which four levels of training outcomes are assessed: reaction (*level 1*), learning (*level 2*), behavior (*level 3*), and results (*level 4*). The seven quantitative evaluation statements and two of the open-ended questions on the postsurvey are examples of evaluating participants’ reactions (*level 1*) to the workshop. The multiple-choice definition questions measured participant knowledge at Kirkpatrick *level 2*. The 10 self-perception statements measured the impact of the training at Kirkpatrick *levels 2 and 3*. *Statements 1, 2, 5, 6, 7, and 10* assessed behaviors, and *statements 3, 4, 8, and 9* assessed knowledge. It is important to note that the self-perception questions are not a direct measure of knowledge and behaviors, but rather participant perceptions of their knowledge and behaviors.

**Analysis.** Participants who completed both pre- and posttests were included in the analysis of the multiple-choice questions. Participants who only completed the posttest were included in the analysis of the retrospective questions and workshop evaluation. A score of one was given for each correct answer, and a score of zero was given for each incorrect answer for the multiple-choice definition test. Descriptive statistics and paired *t* test analyses of the workshop were performed on the quantitative data. Statistics were performed using paired *t* test (Microsoft Excel), with significance of  $P < 0.05$ . Participation in the pre- and postsurveys was voluntary and coded with no identifying

Table 2. Multiple-choice definition questions and answers for paired pre- and posttest

| No. | Question                                                                                                                                                                                                                                                                                                                                      | Choices                                                                                                        | Correct Answer                 |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------|
| 1.  | Occurs when a person from an underrepresented group is assumed to belong to a lower social category or position:                                                                                                                                                                                                                              | a. Failure to Differentiate<br>b. Status Leveling<br>c. Stereotype Replacement<br>d. Stereotype Suppression    | Status Leveling                |
| 2.  | When members of a minority group are treated as representative of their entire group rather than as individuals, especially when they are a numeric minority or the only person from that group present, it is termed:                                                                                                                        | a. Individuation<br>b. Microinequities<br>c. Stereotype Replacement<br>d. Tokenism                             | Tokenism                       |
| 3.  | Scenario: A professor says to a student “I believe that attention to race is unimportant, because racism doesn’t exist anymore.”                                                                                                                                                                                                              | a. Color-Blind Racial Attitudes<br>b. Failure to Differentiate<br>c. Microaggression<br>d. Stereotype          | Color-Blind Racial Attitudes   |
| 4.  | Scenario: A student confuses one black graduate student with another black graduate student.                                                                                                                                                                                                                                                  | a. Color-Blind Racial Attitudes<br>b. Failure to Differentiate<br>c. Microinvalidation<br>d. Status Leveling   | Failure to Differentiate       |
| 5.  | The intrinsic or ingrained biases that cause us to automatically sort people into groups is termed:                                                                                                                                                                                                                                           | a. Explicit Bias<br>b. Implicit Bias<br>c. Racial Colorblindness<br>d. Stereotype Suppression                  | Implicit bias                  |
| 6.  | Characteristics and knowledge of a particular group of people, which encompasses language, religion, cuisine, social habits, music, and arts is termed:                                                                                                                                                                                       | a. Culture<br>b. Individuation<br>c. Race<br>d. Social Categorization                                          | Culture                        |
| 7.  | The everyday verbal, nonverbal, and environmental slights, snubs, or insults, whether intentional or unintentional, which communicate hostile, derogatory, or negative messages to target persons based solely upon their marginalized group membership is termed:                                                                            | a. Failure to Differentiate<br>b. Microaggressions<br>c. Shifting Standards of Judgment<br>d. Tokenism         | Microaggressions               |
| 8.  | The presumed incompetence of members of underrepresented groups, which causes well-qualified underrepresented individuals to be judged as highly competent, compared with members of their group, but they are held to even higher standards and require greater proof of competence than comparable members of the majority group is termed: | a. Competency Proving<br>b. Discrimination<br>c. Failure to Differentiate<br>d. Shifting Standards of Judgment | Shifting Standards of Judgment |
| 9.  | A category of people who identify with each other based on similarities, such as common ancestry, language, society, culture, or nation is termed:                                                                                                                                                                                            | a. Diversity<br>b. Ethnicity<br>c. Genetic Ancestry<br>d. Race                                                 | Ethnicity                      |
| 10. | The deliberate, conscious, easy to self-recognize systemic prejudice and/or discriminations is termed:                                                                                                                                                                                                                                        | a. Explicit Bias<br>b. Implicit Bias<br>c. Microaggressions<br>d. Microinequities                              | Explicit Bias                  |
| 11. | The inclusion of different types of people (such as people of different races or cultures) in a group or organization is termed:                                                                                                                                                                                                              | a. Culture<br>b. Diversity<br>c. Ethnicity<br>d. Racial Colorblindness                                         | Diversity                      |
| 12. | The action or state of including, or of being included within, a group or structure is termed:                                                                                                                                                                                                                                                | a. Bias<br>b. Diversity<br>c. Exclusion<br>d. Inclusion                                                        | Inclusion                      |

information; therefore, it was anonymous. Data were analyzed for all faculty and staff and for faculty only.

## RESULTS

Workshop attendees included diverse groups of faculty and administrators (associate deans, professors, associate professors, assistant professors, and instructors), and staff (human resources supervisors, post-doctoral fellows) from the LSUHSC-NO Schools of Medicine, Nursing, Allied Health Professions, and Public Health. Some of the workshop attendees registered for the workshop voluntarily, and some

were required by their department or research program. Table 5 summarizes the demographics for attendees who completed the presurvey ( $n = 48$ ). Twenty-one percent of the attendees were staff, 5% associate deans, 33% full and associate professors, 33% assistant professors, 67% were women, 33% were non-white, 38% were aged 45–54 yr, and 38% had received prior diversity training.

Table 6 summarizes the average scores for the multiple-choice questions asked in both the pretest and posttest ( $n = 35–42$ ). A paired  $t$  test was performed on the data. A correct answer was given a score of one, and an incorrect answer was

Table 3. *Retrospective pre-/postsurvey performed by the attendees regarding their knowledge and perceptions of behavior*

| Responses                                                                                                                                           | Strongly Agree<br>5 | Agree<br>4 | Neutral<br>3 | Disagree<br>2 | Strongly Disagree<br>1 | Mean | SD   | P Value |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------|--------------|---------------|------------------------|------|------|---------|
| 1. I always know what to say when interacting with people from different cultures.                                                                  |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 1 (2)               | 10 (21)    | 23 (49)      | 13 (28)       | 0                      | 3.0  | 0.85 | 0.01    |
| After                                                                                                                                               | 4 (9)               | 16 (34)    | 18 (38)      | 8 (17)        | 1 (2)                  | 3.4  | 0.96 |         |
| 2. I am able to integrate my knowledge of bias into mentoring a student from a group underrepresented in the biomedical sciences.                   |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 8 (17)              | 24 (51)    | 15 (32)      | 0             | 0                      | 3.8  | 0.63 | 0.001   |
| After                                                                                                                                               | 24 (51)             | 19 (40)    | 4 (9)        | 0             | 0                      | 4.6  | 0.51 |         |
| 3. I am aware of the specific obstacles that many students from groups underrepresented in the biomedical sciences encounter in graduate education. |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 9 (19)              | 23 (49)    | 13 (28)      | 2 (4)         | 0                      | 3.8  | 0.83 | 0.001   |
| After                                                                                                                                               | 26 (55)             | 20 (43)    | 1 (2)        | 0             | 0                      | 4.6  | 0.51 |         |
| 4. I am able to recognize biases and stereotypes in graduate education.                                                                             |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 7 (15)              | 31 (66)    | 8 (17)       | 1 (2)         | 0                      | 3.8  | 0.79 | 0.0001  |
| After                                                                                                                                               | 24 (51)             | 23 (49)    | 0            | 0             | 0                      | 4.6  | 0.50 |         |
| 5. I have awareness of unconscious biases.                                                                                                          |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 12 (28)             | 32 (66)    | 3 (6)        | 0             | 0                      | 4.2  | 0.42 | 0.08    |
| After                                                                                                                                               | 25 (53)             | 22 (47)    | 0            | 0             | 0                      | 4.6  | 0.51 |         |
| 6. I am confident in my ability to identify individuals from groups underrepresented in the biomedical sciences.                                    |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 16 (34)             | 26 (55)    | 4 (9)        | 1 (2)         | 0                      | 4.3  | 0.71 | 0.052   |
| After                                                                                                                                               | 28 (60)             | 19 (40)    | 0            | 0             | 0                      | 4.7  | 0.48 |         |
| 7. I respect the values of people from different cultures.                                                                                          |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 19 (40)             | 26 (55)    | 2 (4)        | 0             | 0                      | 4.3  | 0.32 | 0.08    |
| After                                                                                                                                               | 27 (57)             | 18 (38)    | 2 (4)        | 0             | 0                      | 4.6  | 0.61 |         |
| 8. I recognize a lack of diversity in the academic sciences workplace.                                                                              |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 24 (51)             | 19 (40)    | 2 (4)        | 2 (4)         | 0                      | 4.3  | 0.99 | 0.08    |
| After                                                                                                                                               | 27 (57)             | 19 (40)    | 0            | 0             | 1 (2)                  | 4.5  | 0.77 |         |
| 9. I understand the importance of improving diversity in the academic sciences workplace.                                                           |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 26 (55)             | 20 (43)    | 1 (2)        | 0             | 0                      | 4.5  | 0.52 | 0.02    |
| After                                                                                                                                               | 34 (72)             | 13 (28)    | 0            | 0             | 0                      | 4.8  | 0.42 |         |
| 10. I am open-minded to people from different cultures.                                                                                             |                     |            |              |               |                        |      |      |         |
| Before                                                                                                                                              | 25 (53)             | 21 (45)    | 1 (2)        |               | 0                      | 4.5  | 0.51 | 0.17    |
| After                                                                                                                                               | 29 (62)             | 18 (38)    | 0            | 0             | 0                      | 4.6  | 0.50 |         |

Values are no. of responses (with %responses in parentheses);  $n = 47$  participants. Data are paired.

given a score of zero. Participants' knowledge of the definitions of the following terms increased significantly from pre- to postassessment: status leveling, tokenism, color-blind racial attitudes, failure to differentiate, and implicit bias. There were no changes in the participants' knowledge of culture, diversity, explicit bias, ethnicity, microaggressions, inclusion, and shifting standards of judgment between the pre- and postsurveys. The knowledge of the participants in the pretest was 0.90 or

greater for the following terms: culture, microaggressions, ethnicity, explicit bias, diversity, and inclusion. Data analysis of the faculty members only demonstrated the same significant differences between the pre- and posttests compared with the results of the combined faculty and staff.

The written comments of the participants on the large poster boards during three workshops were reviewed by LMHB and one of the authors (T.P.G.) for common themes. In response to

Table 4. *Summary of open-ended questions utilized for the workshop*

| Section of the Workshop                                                           | Open-ended Questions                                                                                                                                                                          | Type of Feedback/Interaction                                                |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Workshop: Video and Discussion                                                    | 1. What is your first impression of the video?<br>2. How did it make you feel?                                                                                                                | Facilitated discussion for 15 min                                           |
| Workshop: Group Brainstorming on Diverse Workforce, Stereotypes, Unconscious Bias | 1. What is the importance of a diverse workforce?<br>2. What are stereotypes? Give examples.<br>3. What are unconscious, implicit biases?                                                     | Small-group discussion (15 min) followed by facilitated discussion (10 min) |
| Workshop: Group Brainstorming on Biases                                           | 1. What biases have you witnessed regarding education or training?                                                                                                                            | Small-group discussion (20 min) followed by facilitated discussion (10 min) |
| Postsurvey                                                                        | 1. What is the single most important concept that you learned today?<br>2. What were the strengths of the presentation?<br>3. What could make this presentation better?<br>4. Other comments. | Self-reflection of the workshop                                             |

Table 5. *Demographics of participants who completed the pre- and postsurveys*

| Demographics of Participants | <i>n</i> | %  |
|------------------------------|----------|----|
| Position                     |          |    |
| Associate Dean               | 2        | 5  |
| Professor                    | 5        | 12 |
| Associate Professor          | 9        | 21 |
| Assistant Professor          | 14       | 33 |
| Instructor                   | 2        | 5  |
| Fellow                       | 1        | 2  |
| Staff                        | 9        | 21 |
| Sex                          |          |    |
| Female                       | 28       | 67 |
| Male                         | 13       | 31 |
| Prefer not to respond        | 1        | 2  |
| Race/Ethnicity               |          |    |
| African American or Black    | 5        | 12 |
| Asian                        | 6        | 14 |
| Hispanic or Latino(a)        | 3        | 7  |
| Prefer not to respond        | 2        | 5  |
| White or Caucasian           | 26       | 62 |
| Age, yr                      |          |    |
| 25–34                        | 2        | 5  |
| 35–44                        | 12       | 29 |
| 45–54                        | 16       | 38 |
| 55–64                        | 8        | 19 |
| 65+                          | 3        | 7  |
| Prefer not to respond        | 1        | 2  |
| Yes, prior training          | 16       | 38 |

Values are no. (*n*) and percentage (%) of participants.

the question: “What is the importance of a diverse workforce?”, the participants’ comments stated the following: “Inclusion, respect, and honor are required for a diverse workforce, accommodating work environment, better products based on multiple perspectives, and representative of population served.” In response to the question: “What are stereotypes? Give examples,” the participants’ comments focused on the following themes: 1) negative generalizations; 2) cognitive abilities (*n* = 2); 3) geographic location (*n* = 2); 4) language (*n* = 2); 5) job and education; 6) socioeconomic status; 7) appearance; 8) physical disability; 9) age (*n* = 2); 10) sex and gender (*n* = 2); 11) body weight; 12) color; 13) race (*n* = 2); 14) ethnicity; 15) political or religious beliefs; and 16) culture.

Specific examples included the following: “Physicians are males; nurses are female; custodians are African-American; thinner people are more productive than overweight; Jews are penny pinchers; Louisiana students are lazy; English language learners are not as smart as native English speakers.” In response to the question: “What are unconscious, implicit biases? Give examples,” the participants’ comments focused on the following themes: 1) automatic, fast-thinking part of brain; 2) assumptions about other people based on external nonverbal and verbal messages of a lifetime; 3) part of being human, good or bad, awareness is key; 4) categorizing an individual based on attitude, color, socioeconomic status, education, culture; 5) grouping students based on appearances; and 6) assuming lower-ranking members have less knowledge. In response to the question: “What biases have you witnessed?”, the participants’ comments focused on the following themes: 1) sexism; 2) ageism; 3) assuming an African-American has a favorite rap group; 4) being told the voice tone, timber, and syncopation are too female to be professional; 5) you’re too cute to be a scientist—quit now; 6) shyness or quietness in Asians allows biases to propagate; 7) masking or hiding religious practices and identity from fear; 8) you’re too young to remember; 9) students tend to segregate into groups of like skin color; 10) we do not have a diverse faculty or student body; 11) quiet students are not smart and don’t have needs; 12) professor only addressing males in STEM field; 13) all Asian students are good at math; and 14) younger people are less competent.

Participants completed a retrospective analysis of their knowledge and perception of behavior before and following participation in the workshop on the postsurvey. Table 3 illustrates the number and percentage of participants who selected each of the five possible responses, ranging from strongly agree (score of 5) to strongly disagree (score of 1). There was a significant increase in response scores of the participants following participation in the workshop compared with before the workshop for the following statements: 1) “I always know what to say when interacting with people from different cultures”; 2) “I am able to integrate my knowledge of bias into mentoring a student from a group underrepresented in the biomedical sciences”; 3) “I am aware of the specific

Table 6. *Descriptive statistics for multiple-choice definition questions for the pretest and posttests*

| Survey Scores for Vocabulary Words |                                |      |      |      |      |          |      |                |          |
|------------------------------------|--------------------------------|------|------|------|------|----------|------|----------------|----------|
| Question No.                       | Vocabulary Words               | Pre  |      | Post |      | Post-Pre |      | <i>P</i> Value | <i>n</i> |
|                                    |                                | Mean | SD   | Mean | SD   | Mean     | SD   |                |          |
| 1.                                 | Status Leveling                | 0.33 | 0.48 | 0.88 | 0.33 | 0.64     | 0.49 | 0.000004       | 42       |
| 2.                                 | Tokenism                       | 0.62 | 0.49 | 0.93 | 0.26 | 0.31     | 0.52 | 0.0002         | 42       |
| 3.                                 | Color-Blind Racial Attitudes   | 0.53 | 0.51 | 1.00 | 0.08 | 0.45     | 0.50 | 0.0004         | 35       |
| 4.                                 | Failure to Differentiate       | 0.71 | 0.46 | 0.97 | 0.17 | 0.21     | 0.42 | 0.0008         | 35       |
| 5.                                 | Implicit Bias                  | 0.88 | 0.33 | 1.00 | 0.02 | 0.07     | 0.40 | 0.02           | 42       |
| 6.                                 | Culture                        | 0.95 | 0.22 | 1.00 | 0.01 | 0.05     | 0.22 | 0.08           | 42       |
| 7.                                 | Microaggressions               | 0.95 | 0.22 | 1.00 | 0.01 | 0.05     | 0.22 | 0.08           | 42       |
| 8.                                 | Shifting Standards of Judgment | 0.48 | 0.51 | 0.62 | 0.49 | 0.14     | 0.68 | 0.09           | 42       |
| 9.                                 | Ethnicity                      | 0.95 | 0.22 | 0.86 | 0.35 | −0.09    | 0.31 | 0.5            | 42       |
| 10.                                | Explicit Bias                  | 0.90 | 0.30 | 0.90 | 0.29 | 0.00     | 0.38 | 0.5            | 42       |
| 11.                                | Diversity                      | 1.00 | 0.00 | 1.00 | 0.00 | 0.00     | 0.15 |                | 42       |
| 12.                                | Inclusion                      | 0.98 | 0.15 | 0.98 | 0.15 | 0.00     | 0.00 |                | 42       |

Values are means and SDs; *n*, no. of participants. Data are paired. Score of 0 = incorrect response. Score of 1 = correct response. Pre, presurvey; Post, postsurvey.

obstacles that many students from groups underrepresented in the biomedical sciences encounter in graduate education"; and 4) "I am able to recognize biases and stereotypes in graduate education." Data analysis of the faculty members only demonstrated the same significant differences between the respective pre- and postsurvey compared with the results of the combined faculty and staff, with the exception of the question, "I always know what to say when interacting with people from different cultures" ( $P = 0.085$ ).

Open-ended questions were analyzed for common themes. In response to the question, "What is the single most important concept that you learned today?", there were 31 comments. Responses focused on recognizing unconscious bias ( $n = 7$ ), learning methods to overcome unconscious bias ( $n = 3$ ), and learning about new terminology ( $n = 2$ ), status leveling ( $n = 2$ ), ineffectiveness of colorblind attitudes ( $n = 2$ ), and tokenism ( $n = 2$ ). In response to the question, "What were the strengths of the presentation?", there were 30 comments. Responses focused on the effectiveness of the group discussions and interactions ( $n = 18$ ), the knowledge and skills of the presenters ( $n = 5$ ), and the presentation of real-life scenarios ( $n = 3$ ). In response to the question, "What could make this presentation better?", there were 25 comments. Responses focused on including concrete ideas of how to modify behaviors in the face of explicit or implicit biases ( $n = 4$ ), and shortening the workshop ( $n = 4$ ). Other comments suggested presenting a broader discussion of diversity outside of racial diversity ( $n = 1$ ), more activities for self-reflection ( $n = 1$ ), and inclusion of minorities telling individual stories ( $n = 1$ ). Fifteen participants submitted "other comments," such as, "great workshop" ( $n = 3$ ), "discuss equality of opportunity versus equality of outcome" ( $n = 1$ ), "more information and advice on how to recruit racially diverse students to this university" ( $n = 1$ ), "highly recommend this presentation be developed into a campus-wide initiative" ( $n = 1$ ), and "good idea, but the program needs to shift from defining the problem (which we all have a base understanding) to how we can be better change agents."

Table 7 provides participant evaluation of the workshop from excellent or strongly agree (score = 5) to poor or strongly disagree (score = 1), which includes the overall implementation of the workshop, ability to create a comfortable space, and the knowledge of the facilitators. For each survey item, a response of excellent or strongly agree represented the greatest percentage of attendee responses.

## DISCUSSION

Diverse working groups generate new ideas, are more creative, and are more satisfied when working together than homogeneous groups (24). Analogous to this idea, increasing the development of all students, including students from diverse backgrounds, can lead to a more diverse biomedical workforce and a faculty that may produce similarly beneficial outcomes. Creating inclusive workforce environments allows for more harmonious interactions between individuals of diverse backgrounds (25), which promotes 1) increased commitment and motivation, 2) maximized productivity, 3) positive impact on job satisfaction, 4) greater success in retention, and 5) attraction of new talent (7). It is hoped that an improved academic environment will accomplish the same goals. The workshop was developed to support a diverse, inclusive academic workforce, and its outcomes can serve as a foundation for future studies.

This single workshop achieved its first objective of educating attendees on common terminology used when discussing inclusive environments. Participant knowledge improved in 5 of the 12 terms. In addition, results from the open-ended question, "What is the single most important concept that you learned today?", indicated knowledge gains with key terms and definitions. The knowledge of the participants in the pretest was 0.90 or greater for the following terms: culture, microaggressions, ethnicity, explicit bias, diversity, and inclusion, indicating participants had prior knowledge of these terms or were able to use deductive reasoning based on the term and available definition choices. Thirty-eight percent of the participants indicated they had received prior diversity training. This prior training could have had an impact on knowledge of survey terms.

The second learning objective of the workshop included participants gaining information related to implicit bias and its impact in establishing an inclusive environment supporting students from diverse backgrounds. Analysis of open-ended statements provides support for achieving the second objective. Ten participants indicated that the single most important concept learned was recognizing unconscious bias and learning methods to overcome unconscious bias. These responses provided support for minimizing implicit bias through education that both increases awareness and provides bias reduction strategies (15, 21). The workshop encouraged participants to be more introspective and cognizant of their biases and then

Table 7. Postsurvey results of the workshop evaluation by the attendees

|                                                               | 5<br>Excellent | 4<br>Very Good | 3<br>Good | 2<br>Fair | 1<br>Poor         | Mean | SD   |
|---------------------------------------------------------------|----------------|----------------|-----------|-----------|-------------------|------|------|
| Postsurvey evaluation questions                               |                |                |           |           |                   |      |      |
| Ability of facilitators to create a comfortable space         | 34 (72)        | 9 (19)         | 3 (6)     | 0         | 0                 | 4.83 | 0.39 |
| Knowledge of presenters                                       | 32 (68)        | 13 (28)        | 1 (2)     | 0         | 0                 | 4.58 | 0.77 |
| Overall evaluation of workshop                                | 25 (53)        | 16 (34)        | 4 (9)     | 1 (2)     | 0                 | 4.31 | 0.89 |
| Usefulness of information                                     | 24 (51)        | 17 (36)        | 3 (6)     | 2 (4)     | 0                 | 4.26 | 0.81 |
|                                                               | Strongly Agree | Agree          | Neutral   | Disagree  | Strongly Disagree |      |      |
| Overall, I enjoyed the workshop.                              | 26 (55)        | 17 (36)        | 3 (6)     | 0         | 1 (2)             | 4.42 | 0.96 |
| This workshop is an effective way to teach people about bias. | 23 (49)        | 20 (43)        | 3 (6)     | 0         | 0                 | 4.41 | 0.68 |
| I would recommend this workshop to a colleague.               | 23 (49)        | 20 (43)        | 2 (4)     | 0         | 2 (4)             | 4.37 | 0.96 |

Values are no. of responses (with %responses in parentheses);  $n = 47$  participants.

intervene to change negative behaviors that may affect their decision-making in an academic setting. McLean (14) suggested that

...[R]ather than viewing diversity from the standpoint of difference, we should try to find common ground as a starting point for rationalizing the behavior, attitudes and beliefs of our colleagues, patients, and learners. This makes much more sense than trying to bridge the often wide chasm of difference.

We agree that there is more that makes us similar. When people become aware of their biases, they often adjust their attitudes and behavior to be more egalitarian (19). Ross (20) noted that virtually every important decision that we make in life is influenced by unconscious biases, and, with greater awareness of the unconscious biases, the more likely we are to make the best possible decisions. Banaji and Greenwald (2) discussed the importance for each individual to use knowledge to find ways to understand implicit biases and to neutralize them before they translate into poor behavior. Feedback on learning provided support for the workshop in increasing participant awareness of biases and strategies by which to minimize bias.

Analysis of the self-perception statements also provided support for the goals of the workshop. There was a statistically significant change in pre- to postsurvey responses for 5 of the 10 self-perception statements. Of the four knowledge-based perception statements, there was only one statement where a change was not noted. There was no statistical significance found for the statement, "I recognize a lack of diversity in the academic sciences workplace." Fifty-one percent of the participants strongly agreed with the statement before the training, and 91% either strongly agreed or agreed with the statement following the workshop. With such a high percentage of participants in agreement with this knowledge statement, finding statistical significance would be difficult. Most of the workshop participants were aware of the lack of diversity in the workplace, obstacles underrepresented students face, and the importance of improving diversity. This recognition, as well as an increase in knowledge in many cases, can be the first step to behavior change.

There were two self-perception behavior statements that were found to have a statistically significant change from pre- to postsurvey: 1) "I always know what to say when interacting with people from different cultures"; and 2) "I am able to integrate my knowledge of bias into mentoring a student from a group underrepresented in the biomedical sciences." The use of the term "always" in the first statement is a definitive decision and should not have been used. However, there was a positive shift in agreement, which indicates participant comfort in their ability to interact with individuals representing different cultures. Additionally, the use of the term "mentoring" in the second statement, which indicates behavior, should not have been used since the act of mentoring is a two-sided experience. Hence, although the participant might perceive the mentoring experience as positive and conducive to the academic advancement to the student, the student who receives the mentoring may have a different opinion. Therefore, since the student point of view is not considered at this time, implementation of such information is incomplete. The workshop fostered attendee active participation, which allowed them to have exposure to people from diverse backgrounds. Many partici-

pants shared personal stories related to the topics of the workshop, which may have strengthened the immersion experience for participants. Additionally, participants were encouraged to communicate with individuals of different backgrounds and explore opportunities for greater understanding in values and differences. The opportunity to interact with a diverse group of people could have also influenced this perception.

Overall, the majority of participants were satisfied with the workshop based on the quantitative evaluation questions. The presenting team realized that it was important for the educational training to include lecture, reflection, and engagement time. In fact, 18 of the participants recognized the importance of including engagement time in the workshop in their evaluations.

Diversity can encompass race, ethnicity, color, gender, socioeconomic status, nationality, citizenship, education, geographic origin, religion, sexual orientation, ability, age, political beliefs, and/or other ideologies. A limitation of our workshop is that it mainly focused on diversity as related to race and ethnicity and less on other components of diversity, such as gender identity, socioeconomic status, age, religion, etc. The survey results did not allow an assessment of how the knowledge gains led to a change in behavior. Additionally, participation in the small-group discussions may have been hindered by the power differential among the various members of the groups. The workshop was initially developed to provide potential faculty research mentors of PREP scholars with knowledge, tools, and strategies to address different challenges and problems that may influence attrition of future PhD students of underrepresented and diverse backgrounds, such as the academic climate. Also, an enhanced awareness of the mannerisms that select against students from underrepresented and diverse backgrounds, microaggressions, was presented to promote effective communication with future PhD students.

Another limitation of the study was that the data collected from administration, faculty, and staff were combined for statistical analysis and utilized nonvalidated surveys. A strength of the study was that we assessed perceptions through retrospective pre-/postsurveys. It has been shown that participants may overestimate their knowledge of a topic in a pre-survey, and that a postsurvey that addresses knowledge before and after the workshop may represent a stronger indicator of acquired knowledge (8). Assessing how participants have integrated the information presented in the workshop and measuring program success rates with the PREP scholars program is the next step in measuring long-term performance. In the future, we plan to create a follow-up survey, which will assess the participants' perceptions of how they have integrated the information learned during the workshop into their personal and professional behaviors. The survey will determine the extent to which the workshop has impacted their practice, perceptions, thoughts, and the impact on decision-making. Additionally, graduate student focus groups and/or surveys will be provided to assess the present inclusiveness of the academic environment.

On completion of the workshop, it is anticipated that faculty will develop an introspective awareness toward the inclusion of a diverse group of future scientists. Of course, this can only be accomplished by a change in behavior of the mentors toward their students, which was not measured in the present study. Moving forward, our overall goal is to provide this work-

shop to basic science faculty, students, and fellows of the LSUHSC-NO School of Graduate Studies. Future plans include transitioning the workshop specifically to other programs: clinical faculty and medical students and faculty at nearby undergraduate institutions. Most importantly, we aim to develop a formalized, longitudinal curricula addressing the recognition and management of implicit biases as recently stressed by Gonzalez et al. (5), as well as expand the focus to include a broader definition of diversity. Mindfulness training is another venue that we would like to explore to address the emotional and metacognitive effects of implicit bias, as proposed by Burgess and associates (3). “In its best light, diversity is opportunity—the opportunity for enrichment, the chance to grow and progress by making full use of difference” (27). By educating participants in these workshops on implicit bias, we hope that we will be able to help promote mutual understanding of diversity and inclusion for mentors, which will allow students from underrepresented backgrounds the same opportunities to think critically and perform high-impact research. Upper administration support was provided to implement these workshops. By having support at all levels, the culture can be shaped to promote more harmonious work environments for students from underrepresented groups, which will add greater value to the university. It will take a national and local effort to continue making progress in developing and sustaining a diverse workforce. We propose a call for future research to standardize definitions related to diversity so that comparative reviews of the literature can be conducted, as more research in this area is published.

#### ACKNOWLEDGMENTS

The authors acknowledge Drs. Patricia E. Molina and Robert T. Maupin, Jr. for critical review of the manuscript.

#### GRANTS

This study was supported by National Institute of General Medical Sciences Grant R25GM121189 and an American Physiological Society Teaching Enhancement Award.

#### DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the authors.

#### AUTHOR CONTRIBUTIONS

L.M.H.-B., A.C.A.-W., F.M.S.-S., F.T., G.P.C., and T.P.G. conceived and designed research; L.M.H.-B. and T.P.G. analyzed data; L.M.H.-B. and T.P.G. interpreted results of experiments; L.M.H.-B. drafted manuscript; L.M.H.-B., A.C.A.-W., F.M.S.-S., F.T., G.P.C., and T.P.G. edited and revised manuscript; L.M.H.-B., A.C.A.-W., F.M.S.-S., F.T., G.P.C., and T.P.G. approved final version of manuscript.

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