

Cultivating Empathy Through Virtual Reality: Advancing Conversations About Racism, Inequity, and Climate in Medicine

Robert O. Roswell, MD, Courtney D. Cogburn, PhD, Jack Tocco, PhD, MPH, Johanna Martinez, MD, Catherine Bangeranye, PhD, Jeremy N. Bailenson, PhD, Michael Wright, EdD, Jennifer H. Mieres, MD, and Lawrence Smith, MD

Abstract

Problem

Racism and bias are fundamental causes of health inequities, and they negatively affect the climate of academic medical institutions across the United States.

Approach

In 2019, the Zucker School of Medicine and Northwell Health piloted a virtual reality (VR) racism experience as a component of professional development for medical school and health system leaders, faculty, and staff. Participants experienced a 60-minute, interactive, large-group session on microaggressions and, as individuals, a 20-minute VR module. These were followed by group reflection and debriefing. The sessions, developed in collaboration with a VR academic team, represented a response

to institutional climate assessment surveys, which indicated the need for expanded professional training on cross-cultural communication and enhancing inclusion.

Outcomes

In October 2019, 112 faculty and staff participated in the workshop. On a postworkshop survey, completed by 76 participants (67.9%), most respondents (90.8%) reported feeling engaged in the VR experience. Additionally, the majority agreed that VR was an effective tool for enhancing empathy (94.7%), that the session enhanced their own empathy for racial minorities (85.5%), and that their approach to communication would change (67.1%). In open-ended responses, participants

frequently conveyed enthusiasm, powerful emotional and physiologic responses, and enhanced empathy. They also suggested more time for follow-up discussions.

Next Steps

Next steps include assessing the scalability of the VR module; determining effective complementary engagements; and measuring the module's longitudinal effects on racial empathy, discrimination, and institutional climate. As VR becomes more common in medical education, developing VR modules to address other forms of discrimination (e.g., sexism, homophobia) could also benefit the institutional climates of medical schools and health systems as academic medicine continues to build toward health equity.

Problem

Bias, racism, and health inequities

A growing corpus of evidence elucidates the various ways in which racism affects health and health inequities. In the United States, trainings to minimize implicit bias and foster cultural humility have become the mainstay of interventions aimed at reducing racial

health inequities, and many of these have led to improvements in provider knowledge and attitudes regarding health care access.¹ However, since racism is a fundamental cause of racial inequities in health,² directing attention to the structural and cultural systems that undergird inequity may be more critical to the effort of realizing health equity.

Racism in the United States is enacted most perceptibly at the interpersonal level, yet it is also deeply rooted in the historical and institutional structures of U.S. society. Structural racism persists in laws and policies that keep some groups at the margins of quality housing, nutrition, education, employment, and health care^{1–3} Enduring racism has perpetuated unequal access to medical care, disproportionately high morbidity and mortality, and underrepresentation of racial and ethnic minorities in the professional health sciences.^{1–3} The ability to engage in a structural analysis of health systems should be a foundational core competency in medicine.

Racial frames and climate in academic medicine

Meaningfully dealing with racial health inequities requires grappling with the historical roots and contemporary realities of racism across U.S. medical systems and society.³ An important step on this path is for physicians and nurses to understand that racial discrimination is not rare in medicine and that racial inequalities in health are fundamentally grounded in structural racism, rather than in patients' behavioral inadequacies.² Notably, institutional climate can also affect the physical and mental health outcomes of providers.⁴ Moreover, discriminatory experiences can directly influence physiologic signs of stress such as activity in the amygdala.⁴

Although academic institutions have begun to address inclusion and bias, data suggest that the overall climate in academic medicine might be moving in an unfavorable direction. For instance, data from the 2019 Graduate Questionnaire (GQ) show worsening outcomes. The GQ,

Please see the end of this article for information about the authors.

The authors have informed the journal that they agree that both R.O. Roswell and C.D. Cogburn completed the intellectual and other work typical of the first author.

Correspondences should be addressed to Robert O. Roswell, 500 Hofstra Blvd. 234, The Zucker School of Medicine at Hofstra/Northwell Hempstead, NY 11549; email: rroswell@northwell.edu; Twitter: @DrRobRoswell.

Acad Med. 2020;95:1882–1886.

First published online July 21, 2020

doi: 10.1097/ACM.0000000000003615

Copyright © 2020 by the Association of American Medical Colleges

Supplemental digital content for this article is available at <http://links.lww.com/ACADMED/A994> and <http://links.lww.com/ACADMED/A995>.

which is administered by the Association of American Medical Colleges to graduating medical students at accredited U.S. medical schools, includes questions that serve as a barometer for climate and racism in medical education institutions. According to the 2019 GQ report, more learners were subjected to racist remarks in 2019 than in 2015 (7.3% in 2015 vs 8.5% in 2019, a 1.2% increase), more learners perceived that they were granted fewer opportunities because of their race or ethnicity (3.4% in 2015 vs 3.7% in 2019, a 0.3% increase), and more were likely to remark that they received lower grades based not on their performance but on their race and ethnicity (3.0% in 2015 vs 3.5% in 2019, an increase of 0.5%).^{5(p35)}

Racial climate remains a challenge at academic medical institutions and racial health disparities persist. The journey to health equity for academic medicine must address the tough issue of institutional climate surrounding race. Additionally, deepening conversations about structural racism are necessary to effectively address racial inequities in health care.

Approach

Context and needs assessment

The Zucker School of Medicine's Office of Diversity and Inclusion and Northwell Health's Center for Equity and Care enjoy a strong, collaborative relationship. The diversity leaders of both jointly administered several surveys to assess institutional climate at Zucker and Northwell. Surveys included the C-Change survey for learners across the health system (<https://www.brandeis.edu/cchange/surveys/medical-student.html>), the annual GQ survey, and the 360° Communication Climate Assessment Toolkit survey (C-CAT) for health system executives, faculty, and patients (<http://www.diversityrx.org/resources/communication-climate-assessment-toolkit-c%E2%97%8Fcat>). Analysis of the survey results (from 3,811 unique responders) suggested that improving cross-cultural communication and enhancing an inclusive climate should be strategic priorities for both the medical school and the health system.

Cultivating empathy and racial awareness

Virtual reality (VR) has been touted as an important tool for promoting empathy,⁶

which we define as the cognitive and emotional capacity to understand or feel another person's experience from within that person's frame of reference. The cultivation of empathy for people from historically disenfranchised ethnic and racial groups has been proposed as an essential strategy for dismantling racism at least since the Civil Rights era.⁷

Cultivating racial empathy among public policymakers and leaders in medicine may be especially important, given their role in shaping law, in developing and enacting policies, and in setting social norms that can either alleviate or exacerbate structural racism. Racial empathy and awareness are also critical to the often-challenging introspective examination of one's own privilege and positionality—both of which are of well-documented importance to racial progress.⁷

VR racism workshop

The medical education community is increasingly exploring VR as a tool for enhancing teaching and learning. For example, some academic institutions are simulating virtual medical emergencies in hopes of more effectively preparing learners for clinical medicine.⁸ To our knowledge, VR has not yet been reported as a tool in diversity and inclusion training in academic medical institutions.

1000 Cut Journey (<https://vhil.stanford.edu/1000cut>), which was developed at research labs at Columbia and Stanford Universities and premiered at the Tribeca Film Festival in 2018, is an immersive VR module wherein participants experience racism from the viewpoint of Michael Sterling, a Black male, at 3 different time points in his life: at age 7, sitting on the floor playing with blocks and being unfairly disciplined by a teacher and taunted by children; at age 15, kneeling on the ground while experiencing an intense interaction with aggressive police; at age 30, being ignored and dismissed during a professional interaction surrounding a job interview, and then sharing a big moment with a romantic partner while listening to a voicemail from the interviewer explaining, "You aren't a good cultural fit for the organization" (See Supplemental Digital Appendix 1 at <http://links.lww.com/ACADMED/A994>). Participants use the VR headset (HTC Vive, Dongguan, China) to immerse themselves in a

virtual world; they *become* Michael (Supplemental Digital Appendix 2 at <http://links.lww.com/ACADMED/A994>). In addition to examining the psychosocial effects of experiencing *1000 Cut Journey*, the creators are exploring its utility in ameliorating race-based health inequities.

In alignment with strategic academic diversity priorities, the diversity leaders from Zucker's Office of Diversity and Inclusion and from Northwell's Center for Equity and Care partnered with the VR lab to develop a professional development workshop including the *1000 Cut Journey* VR experience, which was piloted for medical school leaders, health system executives, faculty, and staff. Staff and faculty who routinely interface with learners were prioritized for this workshop.

The VR professional development workshop occurred over 2 days in October 2019. The workshop included a 60-minute, large-group interactive session on microaggressions and 20 minutes for each participant to individually experience the VR racism module. Diversity leaders facilitated the microaggressions sessions, which ran concurrently with the VR modules. A second 60-minute, large-group reflection and debriefing session occurred after the microaggression sessions and the VR experience. The goals of the initial microaggressions session were to understand how microaggressions affect feelings of inclusion in the clinical setting and to appreciate how microaggressions can influence providers, patients, learners, and—ultimately—health equity. The large-group debriefing sessions were disaggregated by professional role to encourage more open discussion among participants.

The requirements to run the VR module were as follows:

- a quiet room that can fit a 12' × 12' mat for (2 people),
- electrical outlets (n = 4),
- a desk for a laptop,
- the *1000 Cut Journey* VR software including the HTC Vive (Dongguan, China) mobile headset and handheld controllers, and
- a trained VR staffperson.

The debrief sessions (n = 5, each with 10–35 participants) were held in classrooms with several 10-person tables. Diversity and VR leaders cofacilitated the sessions. At the beginning, one of the facilitators asked participants to reflect on their experiences within groups at their tables. To start the conversation, a facilitator asked participants how they felt, what emotions the VR module elicited, and if a particular VR scenario stood out. After 15 minutes of table discussion, the full group reconvened to share insights. The facilitated discussion focused on the creation of the VR module, the empirical data that led to the creation of the specific VR scenarios, structural racism, the effect of structural racism on participants’ personal lives and on their professional lives at the medical school, as well on its effect on the health system, learners, and patients. We found the 15-minute table discussion to be critically important, for it allowed participants to develop comfort in sharing their experiences openly.

Outcomes

Assessment

To support an initial assessment of the effect of the VR experience, we sent a short survey using Qualtrics software (October 2019; Provo, Utah) to the participants at the conclusion of the session. We designed the 10-question survey to assess the following: participants’ prior experience with a diversity workshop, their prior experience using VR, their sense of presence and sense of immersion, their view on the

effect of the VR session on their empathy, their perception of how effective VR is for understanding the experiences of racial minorities, their view of whether their approach to communication would change, whether any negative physiological effects resulting from the session, and their overall reactions and feedback (See Supplemental Digital Appendix 3 at <http://links.lww.com/ACADMED/A995>).

Presence and the VR experience

Sense of presence in VR reflects the extent to which a participant feels immersed into the virtual world. Research indicates that a greater sense of presence correlates with more effective learning, a greater ability to recall information, and improved facility of learned techniques applied to similar situations or problems.^{8,9} The Presence Questionnaire is a validated tool that is used to assess effects of VR experiences.¹⁰ In total, we derived 3 of our questions from the Presence Questionnaire—specifically to assess participants’ sense of presence, their engagement, and any negative physiological effects.

We also piloted 3 questions to quickly assess self-perceived increased empathy and enhanced communication as a result of the VR experience.

Survey results

Hofstra University’s Institutional Review Board approved the 10-question survey. A total of 112 participants experienced the VR racism workshop in October 2019.

According to faculty affairs data and the information the participants provided when they registered, the majority were female (n = 78, 69.6%) and White (n = 86, 76.8%). Ten (8.9%) of the participants were Asian, 7 (6.3%) Black, and 4 (3.6%) Hispanic. Of the 112 participants, 76 (67.9%) completed the 10-question survey. This workshop represented the first diversity workshop for 22 (28.9%) of the 76 respondents and the first exposure to VR for 50 (65.8%) of them.

Most respondents (n = 69, 90.8%) reported feeling moderately to completely engaged, and 46 (60.5%) reported feeling somewhat present or very present during the VR experience (see Table 1). As mentioned, both of these elements are important components of the learning benefits of VR.^{8,9} A great majority of respondents (n = 72, 94.7%) also agreed or strongly agreed that VR was an effective tool for enhancing empathy, and 65 (85.5%) agreed that the VR experience enhanced their own empathy toward racial minorities. Additionally, 51 respondents (67.1%) reported that they believed the VR experience would change their approach to communication. (see Table 1). Some respondents (n = 14, 18.4%) reported some discomfort following the VR experience such as ataxia, headache, or “feeling off.”

The majority of the qualitative responses reflected enthusiasm and praise. The participants commented specifically on their deep sense of empathy, and they described their strong emotional and

Table 1
Summary of Quantitative Comments Regarding a Virtual Reality (VR)-Based, Professional Development Experience Focused on Racism, October 2019^a

Item from VR evaluation	Item choices: No. (% of 76) endorsing each response choice				
During the VR session, how aware were you of events occurring outside in the real world?	Very aware: 4 (5.3)	Somewhat aware: 19 (25.0)	Neutral: 7 (9.2)	Somewhat unaware: 16 (21.1)	Very unaware: 30 (39.5)
How completely were all of your senses engaged in the VR session?	Not at all: 0 (0)	A little: 7 (9.2)	Moderately: 13 (17.1)	A lot: 33 (43.4)	Almost completely: 23 (30.3)
This VR session is an effective tool for understanding the experiences of other people.	Strongly disagree: 1 (1.3)	Somewhat disagree: 0 (0)	Neither agree nor disagree: 3 (3.9)	Somewhat agree: 27 (35.5)	Strongly agree: 45 (59.2)
After participating in this VR session, I feel that I can better empathize with some of the experiences of minorities in the United States.	Strongly disagree: 1 (1.3)	Somewhat disagree: 1 (1.3)	Neither agree nor disagree: 9 (11.8)	Somewhat agree: 27 (35.5)	Strongly agree: 38 (50.0)
What is the likelihood that the VR session and the debrief has changed your approach to communication within Northwell/ZSOM and in your life outside of the medical school/Northwell?	Extremely unlikely: 2 (2.6)	Somewhat unlikely: 7 (9.2)	Neutral: 16 (21.1)	Somewhat likely: 33 (43.4)	Extremely likely: 18 (23.7)

^aOf 112 participants (from the Zucker School of Medicine [ZSOM]) who completed the sessions, 76 submitted an evaluation.

Table 2
Summary of Qualitative Comments Regarding a Virtual Reality (VR)-Based, Professional Development Experience Focused on Racism, October 2019^a

Theme	No. (% of 40) respondents commenting on theme	Example quotes, illustrating theme
Enthusiasm/praise for VR racism session	26 (65)	<ul style="list-style-type: none"> absolutely awesome and a great experience extremely impactful valuable amazing more people (in particular, people in positions of power) should experience this VR simulation and others like it
Empathy	14 (35)	<ul style="list-style-type: none"> [it was] powerful to literally see things from a different perspective eye-opening, as you never fully understand the impact something has on you until you experience it yourself to actually be in the situations that others deal with on a daily basis, and feel even a part of what they feel, really impacted me this disrupted my assumptions
Emotional and physiological responses	7 (17.5)	<ul style="list-style-type: none"> vulnerable, alone, and humiliated a visceral response and increase in heart rate sad and depressed to be reminded how young boys are subject to such unfair and unjustified (treatment) I had to fight back tears in the VR session, during the debrief, and even after
Critiques and suggestions	7 (17.5)	<ul style="list-style-type: none"> more session time dedicated to debriefing and group discussion about issues raised by the VR module, either as a large group or in smaller break-out groups

^aOf 112 participants (from the Zucker School of Medicine) who completed the sessions, 76 submitted an evaluation, and of the 76 participants who evaluated the VR racism session, 40 (52.6%) wrote an open-ended response. Percentages do not equal 100 since participants could comment on more than one theme.

physiologic responses to the VR session (see Table 2). A few participants suggested longer debriefing sessions.

These initial results suggest that using VR as a platform for discussing structural racism was most effective in heightening engagement, enhancing racial empathy, and improving communication. Through facilitation, the focus of conversations can shift and deepen to include both structural racism as a foundational cause of health inequities and the climate of exclusion that persists in academic medicine. While the U.S. social and historical context is distinct (e.g., the legacy of U.S. slavery), the broader issue of systemic racial and social inequities influencing medical care and population health are relevant in a global context.

Next Steps

The sessions clearly engaged participants, inspired thoughtful deep conversations, and increased indicators of heightened racial empathy. We have not yet assessed whether and in what ways participants’

responses may change over time, nor the types of complementary engagements (e.g., microaggression workshops) that might be most effective in conjunction with the VR. We plan to explore both of these questions, as well as whether increased racial empathy actually translates to improved racial climate and reduced reports of racial discrimination.

Potential applications of VR technology to medical education are broad; however, the relative effect of the different VR environments (e.g., depicting racism in general community environments vs medical-specific environments) needs to be assessed. Scalability is also a consideration for providing more of these VR-based sessions in the future, especially given not only the need for trained staff, but also the logistics of running the entire VR workshop.

This project was a pilot intended to evaluate the utility of integrating a racism-focused VR experience into existing diversity and equity initiatives at

the school and health system level. Next steps include assessing sustainability and building scalability of the VR racism module. VR experiences addressing, for example, homophobia, transphobia, sexism, ableism, or workplace harassment may be quite valuable. We are also interested in exploring ways to integrate VR into curricula for learners.

As the use of VR becomes more common in medical education, we are optimistic that VR technological advances can be used to advance the aims of health equity and inclusion in academic medicine.

Funding/Support: None reported.

Other disclosures: None reported.

Ethical approval: The 10-question survey and project was approved as exempt by Hofstra University’s Institutional Review Board (HUIRB) on October 28, 2019. HUIRB Approval Ref#: 20191106-SOM-ROS-1.

R.O. Roswell is associate dean, Diversity and Inclusion, and associate professor of science education and cardiology, the Zucker School of Medicine at Hofstra/Northwell, Hempstead, New York.

C.D. Cogburn is associate professor of social work, The Columbia Population Research Center and the Data Science Institute, and director, The Cogburn Research Group, Columbia University, New York, New York.

J. Tocco is consultant, the Center for Equity of Care, Northwell Health, Lake Success, New York.

J. Martinez is associate professor of medicine and director, GME Diversity and Inclusion, the Zucker School of Medicine at Hofstra/Northwell, Hempstead, New York.

C. Bangeranye is assistant dean, Diversity and Inclusion, and assistant professor of science education, the Zucker School of Medicine at Hofstra/Northwell, Hempstead, New York.

J.N. Bailenson is Thomas More Storke Professor of Communication, and founding director, Virtual Human Interaction Lab, Stanford University, Stanford, California.

M. Wright is vice president, the Center for Equity of Care, Northwell Health, Lake Success, New York.

J.H. Mieres is chief diversity and inclusion officer, senior vice president, the Center for Equity of Care, Northwell Health, and associate dean, Faculty Affairs, and professor of cardiology, the Zucker School of Medicine at Hofstra/Northwell, Hempstead, New York.

L. Smith is executive vice president and physician-in-chief, Northwell Health, and dean, the Zucker School of Medicine at Hofstra/Northwell, Hempstead, New York.

References

- Williams DR, Lawrence JA, Davis BA. Racism and health: Evidence and needed research. *Annu Rev Public Health.* 2019;40:105–125.
- Cogburn CD. Culture, race, and health: Implications for racial inequities and

- population health. *Milbank Q.* 2019;97:736–761.
- 3 Feagin J, Bennefield Z. Systemic racism and U.S. health care. *Soc Sci Med.* 2014;103:7–14.
 - 4 Williams DR, Lawrence JA, Davis BA, Vu C. Understanding how discrimination can affect health. *Health Serv Res.* 2019;54(suppl 2):1374–1388.
 - 5 Association of American Medical Colleges. 2019 AAMC graduate questionnaire report. <https://www.aamc.org/system/files/2019-08/2019-gq-all-schools-summary-report.pdf>. Accessed July 7, 2020.
 - 6 Herrera F, Bailenson J, Weisz E, Ogle E, Zaki J. Building long-term empathy: A large-scale comparison of traditional and virtual reality perspective-taking. *PLoS One.* 2018;13:e0204494.
 - 7 Lanzoni S. *Empathy: A History*. New Haven, CT: Yale University Press; 2018.
 - 8 Breining G. Future or fad? Virtual reality in medical education. <https://www.aamc.org/news-insights/future-or-fad-virtual-reality-medical-education>. Published August 28, 2018. Accessed July 7, 2020.
 - 9 Peck TC, Seinfeld S, Aglioti SM, Slater M. Putting yourself in the skin of a Black avatar reduces implicit racial bias. *Conscious Cogn.* 2013;22:779–787.
 - 10 Witmer BG, Singer MJ. Measuring presence in virtual environments: A presence questionnaire. *Presence.* 1998;7:225–240.