



COLUMBIA | SOLER

Science of Learning Research Initiative

2021 Provost's SOLER Seed Grants Proposal Template

Section 1: Project Summary			
Award Year:	2021-2022		
Title of Study:	Investigating Bias in Standardized Patient Assessments of Medical Students		
Principal Investigator (PI) Information			
PI #1 Name:	Beth Barron		
PI #1 Title:	Associate Professor		
PI #1 Department:	Medicine, Columbia University Irving Medical Center (CUIMC)		
PI #1 Email:	bab2113@cumc.columbia.edu		
Co-Investigator (CI) Information			
Use an asterisk (*) to denote any CI who will serve as a Co-PI.			
CI #1 Name:		CI #2 Name:	
CI #1 Title:		CI #2 Title:	
CI #1 Department:		CI #2 Department:	
CI #1 Email:		CI #2 Email:	
CI #3 Name:		CI #4 Name:	
CI #3 Title:		CI #4 Title:	
CI #3 Department:		CI #4 Department:	
CI #3 Email:		CI #4 Email:	
Abstract: Describe the project in non-technical language; articulate the project objective; specify what makes the project innovative; describe your assessment or evaluation plan to ascertain student impact or other insights. (Limit 250 words.)			
<i>Note: see Section 2d for list of co-investigators (omitted above because there are more than 4 CIs).</i>			
<p>This project will contribute to understanding how systemic racism in the form of implicit bias adversely impacts medical students of color. The Jaharis Simulation Center at Vagelos College of Physicians and Surgeons (VP&S) provides learner assessments utilizing standardized patient (SP) objective structured clinical examinations (OSCEs) throughout medical school and residency. We have noted that Underrepresented in Medicine (URiM) students are consistently rated 5-10% lower than white students on communication skills. This is consistent with literature demonstrating that students of color and women are given lower OSCE scores in the areas of communication and demonstrated empathy and raises concern for implicit bias in OSCE grading. We aim to contribute by probing how this disparity develops and to investigate methods that can ameliorate it. The project addresses two objectives: (1) investigate if and how SP biases may contribute to lower OSCE scores through review of prior data and implementation of a controlled comparison intervention; and (2) develop and evaluate interventions to reduce bias in SP grading. This project is of critical importance as assessment biases</p>			

may unfairly damage URiM students' long-term career goals, self-confidence, and trust in us. Furthermore, as medical educators, it is our responsibility to foster more accurate, unbiased assessments for all students. VP&S Dean of Education, Director of Equity and Justice in curricular affairs, simulation center leadership, and the Columbia Center for Educational Research and Evaluation (CERE) will support and assist with sustainability and academic dissemination of study results; furthermore, this project was awarded a 2021 Large-Scale Provost's Teaching and Learning Grant and will receive support from the Columbia Center for Teaching and Learning (CTL) in instructional design, accessibility compliance, and more.

Section 2: Project Description

Please complete each subsection taking into consideration the accompanying guidelines.

Section 2a: Project Scope. (Limit 500 words.)

- Framing
 - State your overarching objective(s).
 - Identify specific aims and explain how they align with the overarching objective(s).
 - Describe the overall methodology that will be used in this study, covering such factors as retrospective vs. prospective data collection, interventional vs. non-interventional, randomized vs. non-randomized, observational, experimental, etc.
- Participants
 - Identify your target participants (e.g., students).
 - Specify how participants will be identified and contacted.
 - Estimate how many participants will be impacted during the grant period.
 - Briefly describe how the innovation will continue to benefit student cohorts beyond the PSSG duration (e.g., through curricular changes).

Objectives:

1. Elucidate factors that contribute to racial disparities in medical student OSCE scores
2. Describe, implement and disseminate recommendations with respect to interventions (SP trainings, assessment tools) that can mitigate OSCE scoring disparities

Specific Aims (Project Activities):

1. Quantify baseline racial disparities in OSCE scores and investigate potential causes. Although the score differential in URiM is well-established in the literature, we must examine our own scores for patterns of differentials based on the race of our students, the race of our SPs, and intersections thereof. These data will serve as a baseline as we test potential bias-reduction interventions.
2. Investigate the role of SP race in contributing to racial score disparities. Existing literature is observational only; we aim to objectively measure the impact of race. We will recruit 12 SPs (6 black and 6 white) to participate. Each SP will complete a communications skills checklist by observing 24 pre-selected OSCEs. 12 of the OSCEs will be video and 12 will be audio only to blind to student race. OSCEs will be chosen to ensure an equal division of URiM vs. white and skill set (low, medium and high). SPs in one subset will watch video recordings of OSCEs, whereas SPs in another subset will listen to audio-only OSCEs; both subsets will score the OSCEs via our standard assessment form. We will examine scores of audio-only vs. video assessments for patterns in student and/or SP race. We hypothesize that scores of audio recordings will be less racially divergent than those of video.
3. Do an item analysis of the communications skills checklist to determine whether any elements are particularly prone to bias. We may reword or remove such elements.
4. Develop and implement a sustainable and effective unconscious bias training plan for SPs. We will create video recordings to embed in an interactive storyline framework and share them with the local and national health professions education community. The program, to be developed by research team members with expertise in education and implicit bias, will include in-person and flipped-classroom work and will utilize visualization and narrative medicine exercises.
5. Measure the impact of unconscious bias training. The 12 SPs who participated in (2) will undergo the unconscious bias training. We will repeat the exercise in (2), selecting 24 new OSCEs, half audio-only and half video (again divided evenly by URiM vs. white and skill level) for assessment; we hypothesize that the racially divergent scoring of video OSCEs (if that is established at baseline) will be reduced.

6. Implement an ongoing surveillance plan to identify and address bias in our OSCE assessments. After each OSCE we will examine the scores for gaps associated with race. We will measure the score gap between SPs who have undergone the training vs. those that have not in order to test whether the intervention works in a real life setting and its benefits persist; if so, we will require all SPs to complete training in unconscious bias prior to working with students. This data will be reported quarterly; if gaps revert to their prior level, repeat training will be implemented.
7. Share our results and training with other institutions. We will secure IRB approval for this project and publish our results to help other institutions improve their own simulation centers, sharing SP training techniques and resources in an open format.

Section 2b: Rationale and Literature Review. (Limit 500 words.)

- Describe how the project aligns with national and/or Columbia strategic initiatives.
- Highlight key findings of relevant educational research. Include citations as appropriate.
- Describe any prior work your team has done in this space.

Bias in medical education is well-documented. A cohort study of 27,504 graduating medical students reported 23.3% of URiM students experiencing mistreatment in the form of racial/ethnic discrimination, compared to 3.8% of white students^[1]. URiM medical students also report lower evaluations scores based on race as documented at University of Washington School of Medicine where, out of 892 medical students surveyed, white students were up to twice as likely to receive high scores on clinical evaluations and better final clerkship grades as students of color after adjusting for USMLE Step 1 scores^[2]. Similarly, at University of California San Francisco from 2013-2016, URiM students received approximately half as many clinical clerkship honors grades on average as non-URiM students^[3]. Furthermore, the OSCE, a widely employed medical education clinical evaluation tool, is prone to bias. Newlin-Canzone et al's publication about SP bias suggested that the significant mental demand required by SPs' to simultaneously portray a character and evaluate trainees may negatively impact their ability to provide accurate evaluations^[4]. Studies regarding gender-related bias are more robust than those addressing race-related bias. Multiple studies have demonstrated significant differences in SP clinical assessment scores between male and female trainees. For example, Berg et al. evaluated bias specifically with regard to empathy scores, finding significantly lower SP-determined empathy scores in women than men, with male black students receiving the lowest empathy scores^[5]. There are limited studies that examine causes of differential scoring of the types of findings reported in the observational studies cited above. Some studies have reported influence of SP characteristics in clinical skills assessment scores. Whereas gender concordance may sometimes result in lower scorings: Huang et al. demonstrated that, for male students, communication skills ratings were significantly lower when scored by male SPs compared to female SPs^[6]; Van Zanten et al. found that racial concordant SP-student pairings resulted SPs providing higher satisfaction ratings^[7]. Zweifler et al. similarly showed that black students had lower interviewing skills scores than non-African American students in interactions with white (but not black) SPs^[8]. While many have studied and identified trends indicating bias in SP evaluation of medical trainees, no one has trialed interventions that may mitigate this bias. Our project endeavors to fill this gap in research and impact bias in medical education on multiple levels. With reference to OSCEs in particular, information from this project can inform simulations with SPs in every corner of medical assessment of trainees. OSCE's are a well-established assessment method in medical education utilized in medical schools, training programs and board examinations. Further, data from this study may add nuance to conversations about evaluations of trainees of color on all levels of medical education. Finally, investigations into ways to mitigate implicit bias are in the early stages. Investigations into this area are a timely and critical step to begin repairing the devastating damage that has been done to our communities of color and restoring trust in our medical institutions.



References:

1. Hill, K. et al. Assessment of the Prevalence of Medical Student Mistreatment by Sex, Race/Ethnicity, and Sexual Orientation. *JAMA Intern Med.* 2020;180(5):653–665.
2. Low, D. et al. Racial/Ethnic Disparities in Clinical Grading in Medical School. *Teach Learn Med.* 2019;31(5):487-496.
3. Teherani, A. et al. How Small Differences in Assessed Clinical Performance Amplify to Large Differences in Grades and Awards: A Cascade With Serious Consequences for Students Underrepresented in Medicine. *Acad Med.* 2018;93(9):1286-1292.
4. Newlin-Canzone, E. T., et al. (2013). "The cognitive demands of standardized patients: understanding limitations in attention and working memory with the decoding of nonverbal behavior during improvisations." *Simul Healthc* 8(4): 207-214. 6.
5. Berg, K., et al. (2015). "Standardized patient assessment of medical student empathy: ethnicity and gender effects in a multi-institutional study." *Acad Med* 90(1): 105-111.
6. Huang, C. C., et al. (2015). "The influence of gender on the communication skills assessment of medical students." *Eur J Intern Med* 26(9): 670-674.
7. van Zanten, M., et al. (2004). "The influence of ethnicity on patient satisfaction in a standardized patient assessment." *Acad Med* 79: S15-S17.
8. Zweifler, A. J., et al. (2000). "The importance of race in medical student performance of an AIDS risk assessment interview with simulated patients." *Med Educ* 34(3): 175-181.

Section 2c: Assessment and Evaluation Plan for Specific Aims. (Limit 250 words.)

- Describe novel or to-be-adapted measurement tools (e.g., surveys).
- Outline key comparisons and briefly describe data analysis procedures.

See graphical depiction below:

Intervention	Immediate Target	Ultimate Target
<p>1. OSCE Assessment Scoring Rubric Review</p> <p>2. SP Bias Training</p> <p style="text-align: right;"></p> <p><i>SP Bias Training Components</i></p> <p><u>Knowledge/Awareness</u></p> <ul style="list-style-type: none"> • Implicit bias science and impact <p><u>Attitudes</u></p> <ul style="list-style-type: none"> • Personal bias (as measured by Harvard IAT) • Narrative training <ul style="list-style-type: none"> -personal narrative -narratives of people of color -case studies, scenarios, and reflection <p><u>Skills</u></p> <ul style="list-style-type: none"> • Post-intervention practice 	<p style="text-align: right;"></p> <p>SP Scoring System Accuracy/Fairness</p> <p><i>Intermediate Evaluations</i></p> <p><u>Pre- and post-training SP surveys</u></p> <p><u>Post-training video evaluation</u></p>	<p>Decrease in Student Racial OSCE Score Disparity</p> <p><i>Ongoing Evaluation</i></p> <p><u>Ongoing monitoring of student OSCE scores</u></p> <p><u>Ongoing monitoring of student OSCE scores</u></p> <p><u>Ongoing evaluation and as-needed modification of SP training</u></p> <p><u>Ongoing monitoring of SP pool racial diversity to maximize assessment fairness and accuracy</u></p> <p><u>Partnering and dissemination of research findings to SIM centers colleagues, locally and nationally</u></p>
<ul style="list-style-type: none"> • Analysis procedures: <ul style="list-style-type: none"> ○ Pre- and post-training SP surveys will be evaluated with Mann-Whitney tests to compare mean (Likert-scale) ratings. ○ OSCE scores will be evaluated with t-tests to compare means. 		
<p>Section 2d: Role of Key Personnel. (Limit 150 words.)</p> <ul style="list-style-type: none"> • Specify the expectations and obligations of all project personnel. • Outline expected needs for in-kind support from SOLER facilitators. 		
<ul style="list-style-type: none"> • Dr. Beth Barron, Associate Professor of Medicine, Associate Director of Jaharis Simulation Center; expertise in student assessments; will supervise all project activities. • Dr. Hetty Cunningham, Associate Professor of Pediatrics, Director of Equity and Justice in Curricular Affairs, VP&S; expertise in bias in medicine; will lead project activities 4-6, • Dr. Nicole Furlonge, Klingenstein Family Chair Professor, Teachers College, Director of Klingenstein Center for Independent and International School Leadership; expertise in narrative medicine practices, cultural studies-informed learning, and intervention design; will support project activities 3-6. 		

- Dr. Alves-Bradford, Associate Clinical Professor of Psychiatry, Director, Office of Equity, Diversity and Inclusion, Dept. of Psychiatry; expertise in individual and structural interventions; will support project activities 4-6.
- Dr. Prantik Saha, Assistant Clinical Professor of Pediatrics; expertise in training SPs and developing communication skills assessment tools; will lead project activity 3.
- Mr. Zach Milligan, lead Simulation Educator, Jaharis Simulation Center; expertise in technical aspects of OSCE production, hiring and training standardized patients; will support project activities 1-4 and 6
- Dr. Joseph Picoraro, Assistant Professor of Pediatrics, Associate Course Director, Foundations of Medicine Tutorials; expertise in teaching students clinical skills and using OSCEs for student assessments; will support project activities 3, 6, and 7.
- Dr. Amanda Schneier, Assistant Professor of Medicine, Associate Course Director, Foundations of Medicine Tutorials; expertise in teaching students clinical skills and using OSCEs for student assessments; will support project activities 3, 6, and 7.

The primary expected In-kind support needs from SOLER are the following:

- IRB protocol development and correspondence
- Statistical procedures including calculating statistical power to inform study design
- Refinement of assessment tools
- Secure data storage and data analysis/visualization

Note: this project has already been awarded a Large-Scale Provost's Teaching and Learning Grant and will be supported by the CTL in areas such as course implementation, instructional design, accessibility compliance, design and implementation of unconscious bias training for SPs, planning and creating course media, technical and instructional design support on the design and security/ accessibility of self-authored e-learning tutorials.

Section 3: Graphical Project Timeline

Use a graphical timeline to depict the schedule for your project. The timeline should include start and finish dates for your project as well as the dates or periods during which various project tasks will occur. Indicate how you will monitor the effectiveness of the project as it evolves. All elements of the project should be completed within 12 months of receiving funds.



The entire study team will meet monthly online to update on progress and plan for next steps. Subgroups will meet weekly to update on individual project components when active. All groups will keep process notes and will consult with local and national experts as necessary.

Note: project activities may exceed the 12-month duration specified by the SOLER grant. If so, the research team will apply for a continuation to renew SOLER support in 2022.

Section 4: Budget Overview and Justification.

Provide a detailed budget and justification for funds. Funding can be used for expenses such as equipment, shipping, media development, compensation for study participants (typically students), compensation for research assistants, and conference registration. Please mention all other sources of funding, if any. The total budget requested should not exceed the maximum award amount of \$5,000.

The research team has already secured approximately \$15,000 funding from the Large-Scale Provost's Teaching & Learning Grant. The original figure requested in that grant proposal was \$20,000. Therefore, the PSSG award will be used to make up that budget shortfall. Specifically, the PSSG funds will be allocated to the following:

Dr. Nicole Furlonge's stipend to cover time for development of anti-bias training for SPs and implementation (**\$5,000**)