“Fair Play”: A Videogame Designed to Address Implicit Race Bias Through Active Perspective Taking

Belinda Gutierrez, PhD,^{1,2,*} Anna Kaatz, PhD, MPH,^{2,*} Sarah Chu, MEd,^{3,4} Dennis Ramirez, MA,^{3,4}
Clem Samson-Samuel,^{3,4} and Molly Carnes, MD, MS^{1,2,5–7}

Abstract

Objective: Having diverse faculty in academic health centers will help diversify the healthcare workforce and reduce health disparities. Implicit race bias is one factor that contributes to the underrepresentation of Black faculty. We designed the videogame “Fair Play” in which players assume the role of a Black graduate student named Jamal Davis. As Jamal, players experience subtle race bias while completing “quests” to obtain a science degree. We hypothesized that participants randomly assigned to play the game would have greater empathy for Jamal and lower implicit race bias than participants randomized to read narrative text describing Jamal’s experience.

Materials and Methods: University of Wisconsin–Madison graduate students were recruited via e-mail and randomly assigned to play “Fair Play” or read narrative text through an online link. Upon completion, participants took an Implicit Association Test to measure implicit bias and answered survey questions assessing empathy toward Jamal and awareness of bias.

Results: As hypothesized, gameplayers showed the least implicit bias but only when they also showed high empathy for Jamal ($P=0.013$). Gameplayers did not show greater empathy than text readers, and women in the text condition reported the greatest empathy for Jamal ($P=0.008$). However, high empathy only predicted lower levels of implicit bias among those who actively took Jamal’s perspective through gameplay ($P=0.014$).

Conclusions: A videogame in which players experience subtle race bias as a Black graduate student has the potential to reduce implicit bias, possibly because of a game’s ability to foster empathy through active perspective taking.

Introduction

BLACK FACULTY ARE PERSISTENTLY underrepresented in academic health centers¹ despite evidence that increasing faculty diversity is a potent strategy for diversifying the science and healthcare workforce^{2,3} and for helping to reduce health disparities.⁴ Factors such as constrained economic resources, fewer opportunities for academic preparation, and less access to social capital, as well as overt (i.e., “explicit”) race bias, hinder the advancement of blacks in academic science and medicine.^{3,5–8}

In addition, a large body of theoretically sound, experimentally tested evidence makes a compelling case that the mere existence of race stereotypes leads to unconscious or “implicit” bias.^{9,10}

Implicit bias is prejudice in favor of or against a person or group that functions outside of conscious attentional focus.⁹ The majority of individuals show implicit biases based on the content of cultural stereotypes,^{11,12} and experiments find that

¹William S. Middleton Memorial Veterans Hospital, Madison, Wisconsin.

²Center for Women’s Health Research, University of Wisconsin–Madison, Madison, Wisconsin.

³Games, Learning and Society, University of Wisconsin–Madison, Madison, Wisconsin.

Departments of ⁴Curriculum and Instruction, ⁵Medicine, ⁶Psychiatry, and ⁷Industrial & Systems Engineering, University of Wisconsin–Madison, Madison, Wisconsin.

*The first two authors contributed equally.

The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the National Institute of General Medical Sciences, the National Institutes of Health, or the Gates Millennium Foundation.

This article represents U.S. Department of Veterans Affairs Geriatric Research Education and Clinical Center manuscript number 2014-024.

implicit bias can predict behavior, even when unaligned with explicit egalitarian beliefs.^{10,13–16} One of the most widely used measures of implicit bias is the Implicit Association Test (IAT).¹⁷ The IAT measures the time it takes to match items from two predefined categories viewed on a computer screen. In the most commonly used Black/White–Good/Bad, or evaluative race IAT, a set of Black or White faces must be matched with pleasant words (e.g., glorious, joy) or unpleasant words (e.g., agony, evil). An individual's implicit bias is reflected in the magnitude of the difference in response times when matching the stereotype-congruent presentations (White/Good, Black/Bad) and the stereotype-incongruent presentations (White/Bad, Black/Good).¹⁸ The majority of test-takers show pro-White bias.^{11,12}

Pervasive and often inadvertent implicit bias can disadvantage Blacks in academic and employment settings^{19–21} and likely contributes to the negative campus climate experienced by Black students and faculty,^{7,8,22,23} the slower promotion rates for Black compared with White faculty (which are unexplained by productivity or length of service²⁴), and the lower award probabilities for National Institutes of Health grants among Black investigators.²⁵ Pro-White implicit bias also impacts clinical decision-making. Physicians with pro-White bias on the evaluative race IAT are less likely to refer Black patients to specialists,²⁶ less likely to prescribe opioid analgesics to postoperative Black children in pain,¹⁶ and receive lower patient satisfaction ratings from Black patients.^{15,27} Relevant to the importance of increasing the diversity of faculty in academic health centers and the subsequent impact on the diversity of the healthcare workforce is that Black physicians demonstrate the least pro-White race bias on the evaluative race IAT.^{12,28,29} Thus, retaining and advancing Black faculty may be particularly important for reducing persistent racial disparities in treatment and patient outcomes.

Increased empathy is linked to reductions in implicit bias.^{30,31} Empathy generally refers to knowing another's internal state, imagining how another is thinking or feeling, and feeling for another who is suffering.³² Empathy can be induced by taking the perspective of another person.^{30,33} Inducing empathy for a member of a negatively stereotyped group can promote positive feelings and actions toward the individual's group as a whole.^{34,35} In a series of experiments, Todd et al.³⁶ demonstrated that inducing empathy through perspective taking can reduce implicit bias towards Blacks. In one study, participants watched videos depicting a Black man and a White man receiving differential treatment as they went about everyday activities; in other studies, participants viewed a photograph of a young Black man and were asked to write an essay about a day in his life. Taken together, these studies showed that participants who adopted the perspective of the Black individual (in contrast to being instructed to remain objective) had greater empathy, lower implicit race bias, and more positive intergroup behaviors. The proposed mechanism for increasing empathy and reducing prejudice and stereotyping through perspective taking is the cognitive merging of the perspective taker with the stereotyped group member.^{37,38}

Role-playing videogames provide an ideal opportunity to engage players in perspective taking. Gee^{39–41} calls this form of perspective taking “projected identity.” According to Gee, the videogame environment allows players to create

cognitive representations of the game characters that overlap with their own self-representations. Players attribute certain mental states to game characters (e.g., beliefs, values, feelings, attitudes) that are intertwined with players' own mental states.⁴¹ Videogames allow players to experience empathy while simultaneously engaging in goal-directed behavior. We use the term “active perspective taking” to refer to the projected identity experienced through playing a videogame, where the player not only imagines how another person feels in a given situation, but also directs how that person responds. Based on this definition, active perspective taking includes interventions in which participants act in the role of another person through avatar role-play.⁴² In contrast, we use the term “passive perspective taking” to refer to interventions where participants are asked to take another person's perspective while being shown a picture or video, listening to an interview, or reading narrative text describing the experiences of another person.^{34,35,43–46}

Two studies have examined the effect of avatar-based perspective taking on a version of the evaluative race IAT, but neither used a videogame format. Groom et al.⁴² studied participants who either took the role of a Black avatar in a fictitious job interview within an immersive virtual reality environment or received verbal perspective-taking instructions. Participants who actively took the perspective of a Black avatar showed stereotype activation and greater implicit race bias than those who took the perspective of White avatars (regardless of their own race). By comparison, Peck et al.⁴⁷ found that participants embodied in a dark-skinned avatar had lower implicit bias than those embodied in a light skin or alien avatar. The difference in the results of these two studies suggest that assuming the role of a Black avatar in a condition where negative stereotypes about the competence of Blacks versus Whites exist (i.e., hiring) may reinforce race bias, whereas active perspective taking in a stereotype neutral condition may reduce race bias. An important subsequent research question is how to reduce bias in conditions where negative racial stereotypes are activated. Todd et al.³⁶ found that experiencing subtle race bias in a passive perspective taking condition led to empathy and reduced implicit bias; however, to our knowledge, no prior study has tested whether experiencing subtle race bias through active perspective taking can induce empathy and reduce implicit bias in a condition that activates negative stereotypes about Blacks. Videogames are ideal for further probing this issue because they are more easily disseminated than a laboratory experiment or a virtual reality environment.

In this study, we examine the impact of active perspective taking through gameplay as a Black avatar that experiences subtle race bias in a situation that activates negative race stereotypes of competence (i.e., graduate school). We hypothesize that active perspective taking through gameplay will induce greater empathy and result in lower scores on the evaluative race IAT than passive perspective taking through reading narrative text.³⁶

Materials and Methods

Development of “Fair Play”

“Fair Play” was designed to enable players to experience being a Black graduate student in a predominantly White university. We chose graduate school because the

experiences would be familiar to the broadest group of science and healthcare professionals, who are our target players. Based on point-and-click adventure games, “Fair Play” covers typical academic challenges such as choosing an advisor and securing funding, to more extreme situations such as defending yourself against a charge of plagiarism. The main character, Jamal Davis, experiences the kind of subtle unintentional racial discrimination that results from implicit bias. Players are introduced to the concept of implicit bias through Jamal’s interactions with non-player characters. Players are encouraged to imagine themselves as Jamal and reflect on the impact of non-player characters’ implicit race bias. When Jamal encounters an example of implicit bias, such as being mistaken for a caterer (status leveling⁴⁸) or being asked to speak on behalf of all Black graduate students (tokenism⁴⁹), the player is alerted to the bias by the appearance of an Almanac for “just-in-time learning.”⁵⁰ The Almanac includes definitions of the specific bias encountered, in-game examples, and citations to supporting research.

The content of the game was developed by a demographically and disciplinarily diverse group of graduate students, faculty, and staff at the University of Wisconsin–Madison, in collaboration with experienced game developers.^{51–54} Game content was based on literature reviews, personal experience, and feedback from cycles of playtesting (for more information, or to play the current version of the game, visit <http://www.gameslearningsociety.org/games.php>).

Study design

After approval from the Institutional Review Board, graduate students in all biological, social, and physical science departments at the University of Wisconsin–Madison were invited to participate in the study via e-mail. The e-mail included a link that randomly redirected participants to either the experimental or control condition. The experimental condition contained the game described above. The control condition contained a website that presented participants with an image of Jamal and a narrative of the experiences he has in “Fair Play.” Participants in both conditions were asked to “imagine yourself as Jamal,” based on the instruction phrase found to effectively induce perspective taking.^{33,35,55} We chose narrative text as the control because it has commonly been used to induce passive perspective taking.^{34,56–58}

After completing the game or reading the narrative, participants in both experimental and control groups took the Black/White-Good/Bad, evaluative IAT.^{17,18} The IAT results are reported as D-scores, obtained by dividing the difference in reaction times when matching stereotype-congruent trials (White faces with pleasant words and Black faces with unpleasant words) and stereotype-incongruent trials (White faces with unpleasant words and Black faces with pleasant words) by the standard deviation of all reactions. As described in detail by Greenwald et al.,¹⁸ this differs slightly from the more familiar Cohen’s d-score,⁵⁹ in which one would take the difference between two means and divide that by the standard deviation. An IAT score between 0.01 and 2.0 indicates that the participant was faster to match stereotype-congruent pairs, in this case suggesting a bias toward associating White faces with positive words. A score between –0.01 and –2.0 suggests a bias toward associating Black faces with positive words. Standard IAT procedure,

reliability, and validity have been described in detail elsewhere.^{14,60–62}

Following the IAT, participants were asked to complete a brief survey that measured bias awareness, perspective taking, and empathy.⁶³ To compare the level of bias awareness induced and the effectiveness of the perspective taking manipulation by experimental condition, we developed two 7-point Likert scales. The bias awareness scale included four questions that queried the extent to which participants perceived that the exercise accurately portrayed racial bias, if the types of racial bias that occurred in the exercise happened to Blacks in academic settings, and if negative events that happened to Jamal could have happened to members of other stereotyped groups such as women or people with disabilities. A fifth question—asking if events that happened to Jamal could have just as easily happened to a White man (reversed coded)—was eliminated because it reduced the reliability of the scale (Cronbach’s $\alpha=0.52$). Without the final question this scale had acceptable reliability (Cronbach’s $\alpha=0.70$). The three-question perspective taking scale measured the extent to which participants took Jamal’s perspective, imagined how he felt, and what he thought. This scale was highly reliable (Cronbach’s $\alpha=0.89$). We measured empathy with a six-question scale previously used by Batson et al.^{33–35} and Lamm et al.⁶⁴ This scale measures feelings of compassion, tenderness, soft-heartedness, and sympathy on a 7-point Likert scale³⁴ and was highly reliable (Cronbach’s $\alpha=0.95$). Items for each scale were averaged to create mean bias awareness, perspective taking, and empathy scores for each participant.

Participants were also asked to report their gender, age, race/ethnicity, and previous videogame experience (Table 1). For the latter measure, we classified participants as experienced gamers based on the number of different game systems or devices they use to play games (e.g., tablet, console, computer) plus the number of hours per week they play games. This was scored on a scale of 0 to 14. Participants who scored higher than a 4 were classified as “experienced gamers.” We also included questions about engagement in the game that are not directly related to our hypothesis and are not reported here.

Manipulation check

To test that similar levels of bias awareness and perspective taking were induced for both gameplayers and text readers, we analyzed participants’ bias awareness and perspective taking scores using analysis of variance (ANOVA) with experimental condition (text versus game) and gender (male versus female) as independent variables. Results indicated no significant differences in bias awareness scores by experimental condition or by gender, indicating that the game was as effective as the text at promoting bias awareness and that participants perceived racial bias to be portrayed in a similarly accurate way in both conditions. Perspective taking scores did not differ by experimental condition but showed a main effect for gender ($F_{1,118}=14.5$, $P<0.001$). Pairwise comparisons revealed that women (mean=5.70, standard error [SE]=0.16) had significantly higher perspective taking scores than men (mean=4.87, SE=0.15). Pairwise comparisons performed on the two-way interaction term between experimental condition and gender confirmed that women in both the game (mean=5.70,

TABLE 1. DESCRIPTION OF PARTICIPANTS

	<i>Experimental condition</i>		
	<i>Text group</i> (<i>n</i> = 67)	<i>Game group</i> (<i>n</i> = 58)	<i>Total</i> (<i>n</i> = 125)
Gender			
Male	31 (46)	32 (55)	63 (50)
Female	34 (51)	25 (43)	59 (47)
Missing	2 (3)	1 (2)	3 (3)
Age (years)			
18–25	34 (51)	29 (50)	63 (50)
26–35	29 (43)	22 (38)	51 (41)
36–45	2 (3)	6 (10)	8 (7)
Missing	2 (3)	1 (2)	3 (2)
Ethnicity			
Not Hispanic	58 (87)	50 (86)	108 (86)
Hispanic	2 (3)	—	2 (2)
Other ethnicity	4 (6)	7 (12)	11 (9)
Missing	3 (4)	1 (2)	4 (3)
Race			
White	55 (82)	47 (81)	102 (82)
Asian	1 (2)	8 (14)	9 (7)
URM ^a	3 (4)	2 (3)	5 (4)
Other race	7 (10)	1 (2)	8 (6)
Missing	1 (2)	—	1 (1)
Gaming experience			
Non-gamer	32 (48)	23 (40)	55 (44)
Experienced gamer	35 (52)	35 (60)	70 (56)

Data are number (percentage).

^aUnderrepresented minority (URM) groups (in our sample) include African Americans and Native Americans.

SE = 0.23) and text (mean = 5.70, SE = 0.20) conditions had significantly higher perspective taking scores than men in the game (mean = 4.80, SE = 0.21) and text (mean = 4.96, SE = 0.21) conditions, respectively (all $P < 0.05$). Thus, we retained gender as an independent variable in subsequent ANOVA models.

Statistical analysis

We computed Pearson correlations to examine the relationships between study measures. To test our hypothesis, we analyzed experimental and control participants' responses to our dependent variables—empathy and IAT—for statistically significant differences using 2×2 ANOVAs. Experi-

mental condition (game versus text) was our primary independent variable of interest, but we included gender (male versus female) as an independent variable to test for consistency in results across male and female respondents. We tested for main and interaction effects of independent variables on dependent variables. We computed estimated marginal means and performed pairwise comparisons on main effects and interaction terms (Tables 2 and 3). Values of $P \leq 0.05$ indicated statistical significance.

Results

In total, 125 students participated. Although participants were randomized, more participants discontinued playing before finishing the game than discontinued reading the text, so the experimental game group had fewer participants ($n = 58$, 46 percent) than the control text group ($n = 67$, 54 percent). Participants in the text and game groups showed similar distributions by gender, age, ethnicity, and race, although there were slightly more experienced gamers in the game than the text group (Table 1). Most participants ($n = 102$, 82 percent) identified themselves as White.

Overall correlations showed no significant association between empathy and IAT scores ($r = -0.17$), but separate correlations on data from the game and text groups showed a significant negative correlation between IAT score and empathy ($r = -0.33$) among participants in the game group, but not in the text group ($r = -0.05$). Thus, higher empathy for Jamal was related to lower implicit bias only for game-players.

ANOVA results showed a significant main effect for experimental condition on empathy ($F_{1, 115} = 9.05$, $P = 0.003$), with the text group showing significantly higher empathy scores (mean = 4.33, SE = 0.21) than the game group (mean = 3.41, SE = 0.22) ($P < 0.01$) (Table 2). There was also a main effect for gender on empathy ($F_{1, 115} = 8.13$, $P = 0.005$), with women showing significantly higher empathy scores (mean = 4.30, SE = 0.22) than men (mean = 3.44, SE = 0.21) ($P < 0.01$) (Table 2). Although the interaction effect between experimental condition and gender was not significant, pairwise comparisons on the interaction term showed that only in the text condition did women have significantly higher empathy scores than men ($F_{1, 115} = 7.39$, $P = 0.008$) (Table 3). In contrast, there were no significant differences in empathy scores for women and men in the game condition.

We performed a subanalysis on the game group's data to probe the significant correlation between empathy and IAT

TABLE 2. STUDY VARIABLES BY EXPERIMENTAL GROUP AND PARTICIPANT GENDER

<i>Measure</i>	<i>Experimental condition</i>		<i>Gender</i>	
	<i>Text</i>	<i>Game</i>	<i>Male</i>	<i>Female</i>
Bias awareness ^a	5.18 (0.12)	5.06 (0.13)	4.99 (0.12)	5.25 (0.13)
Perspective taking ^a	5.33 (0.15)	5.23 (0.16)	4.87 (0.15) ^b	5.70 (0.16) ^b
Empathy	4.33 (0.21) ^b	3.41 (0.22) ^b	3.44 (0.21) ^b	4.30 (0.22) ^b
IAT	0.25 (0.049)	0.28 (0.052)	0.31 (0.049)	0.22 (0.052)

Data are mean (standard error) values.

^aUsed for manipulation check.

^bDifference in scale score for participants in the game versus text conditions is significant at $P \leq 0.01$.

IAT, Implicit Association Test.

TABLE 3. STUDY VARIABLES FOR MALE AND FEMALE PARTICIPANTS IN THE TEXT AND GAME GROUPS

Measure	Text		Game	
	Male	Female	Male	Female
Bias awareness ^a	4.98 (0.18)	5.38 (0.17)	5.01 (0.17)	5.12 (0.20)
Perspective taking ^a	4.97 (0.21) ^b	5.70 (0.20) ^b	4.77 (0.21) ^c	5.69 (0.24) ^c
Empathy	3.76 (0.30)	4.89 (0.29)	3.11 (0.30) ^c	3.71 (0.33) ^c
IAT	0.25 (0.070)	0.26 (0.067)	0.367 (0.069)	0.180 (0.078)

Data are mean (standard error) values.

^aUsed for manipulation check.

Difference in scale score between male versus female participants in the game or the text conditions is significant as follows: ^b $P \leq 0.05$, ^c $P \leq 0.01$.

IAT, Implicit Association Test.

scores. Regression analysis confirmed that empathy significantly predicted IAT scores for the experimental game group ($B = -0.065$, $SE = 0.026$, $t = -2.54$, $P = 0.014$, $R^2 = 0.11$). To examine the direction of this relationship, we transformed the empathy scale into a high versus low indicator variable by splitting it at its median. We entered the high/low indicator of empathy into an ANOVA as an independent variable with IAT score as a dependent variable. Results showed that game players high in empathy had significantly lower IAT scores (mean = 0.137, $SE = 0.076$) than those low in empathy (mean = 0.374, $SE = 0.053$) ($F_{1, 54} = 6.53$, $P = 0.013$) (Fig. 1). By comparison, similar analysis performed on the text group's data showed that IAT scores did not differ significantly for text readers with high (mean = 0.23, $SE = 0.072$) versus low (mean = 0.31, $SE = 0.083$) empathy scores ($P = 0.44$). Although gameplayers high in empathy had lower IAT scores than high empathy text readers, this comparison was not statistically significant. These results were consistent among male and female participants.

Discussion

Consistent with our hypothesis, gameplayers with high empathy for Jamal showed the least implicit bias (Fig. 1). These results align with prior research showing that perspective taking can induce empathy^{34,35} and that high-induced empathy is linked to lower levels of implicit bias.³⁶ These findings also suggest that implicit bias can be reduced even in a stereotype-activating condition if active perspective taking through gameplay effectively induces high empathy. We found no overall significant differences in IAT scores by experimental condition or gender, and only

through a subanalysis did we identify that high empathy significantly predicted lower IAT scores compared with low empathy for gameplayers. Nevertheless, this finding is significant and does suggest that when gameplay can effectively induce high levels of empathy, implicit bias may be reduced.

Although we found no difference in perspective taking scores between the game and text groups, women in both groups reported significantly higher levels of perspective taking than men. It is possible that women more easily took Jamal's perspective in both conditions because, having experienced subtle gender bias in graduate school, they may be more attuned to Jamal's experiences.^{65,66} The higher level of empathy in the text group was also explained by women who reported significantly greater empathy for Jamal than men. Women have shown higher levels of empathy in other studies.²⁹ By comparison, empathy scores did not significantly differ for women and men in the game group, which may relate to the smaller sample size.

Like Peck et al.,⁴⁷ we found that assuming the role of a black avatar has the potential to reduce implicit race bias. Our results extend the findings of Groom et al.⁴² by showing that implicit bias may be reduced even in a stereotype-activating condition if high empathy is induced through active perspective taking. Our study further demonstrates that an easily accessible videogame can successfully deliver a bias-reducing intervention. Subsequent experiments should investigate what factors contribute to the induction of high empathy in some gameplayers and not others. It may be, for example, that the mechanics of the game were more distracting or frustrating for some players, which tempered their ability to feel empathy. It might also be that differences in self-esteem, which we did not measure, influenced the ability

FIG. 1. Implicit Association Test (IAT) score as an effect of empathy level and experimental condition.

of players to gain empathy. In some studies, only participants with higher levels of self-esteem reported positive intergroup attitudes after engaging in perspective taking.⁶⁷

Empathy research distinguishes between parallel empathy in which the participant exhibits an emotion similar to that of the person whose perspective he or she is taking and reactive empathy in which the participant experiences emotions such as anger or frustration in response to that person's experiences. The questionnaire we used measures reactive empathy. We chose this tool because it is widely used and because Todd et al.³⁶ found that both forms of empathy can effectively reduce implicit bias. If there were differences in parallel empathy between participants who played "Fair Play" or read narrative text, we would not have been able to detect them.

Our study had several other limitations. We did not give participants baseline measures because of concern about the length of time participants would be willing to engage in our study and because of concern about race stereotype priming immediately before the study. A pretest/posttest design would have been useful in comparing the impact of either gameplay or narrative text on baseline measures and should be included in future studies. A different control condition, similar to that used by Todd et al.,³⁶ in which participants were instructed to remain objective, or one that did not activate stereotypes, could have made the effects of the game more discernible. In the game condition, more participants were classified as experienced gamers than non-gamers. Because the assessments were administered after reading the website material or playing the game, we do not know whether fewer self-reported experienced gamers were randomized into the game condition, or if self-reported non-gamers were more likely to drop out of the game condition. If non-gamers were more likely to drop out of the game condition, this selective attrition may have had an influence on the results of the study. For example, it is possible that perspective taking was enhanced in experienced gamers because of their greater ability to engage with the game. Another limitation of this study is the absence of a behavioral measure to evaluate the extent to which lower implicit bias is related to intergroup actions. Despite study limitations, we were able to show that when gameplay can induce high empathy it has the potential to reduce implicit bias; this suggests gameplay may be at least as effective as reading text for reducing intergroup bias³⁶ and that videogames have potential as interventions to reduce implicit bias.

Findings from this study have important implications for broadening diversity in academic health science centers. Implicit bias undoubtedly contributes to the underrepresentation of Black faculty in academic science and medicine, which in turn contributes to persistent health and healthcare disparities in the United States. Although further research is needed, "Fair Play" may prove to be a useful tool in promoting empathy and reducing the implicit race bias that constrains opportunities for full participation and advancement of Black students in academic health science careers.

Acknowledgments

This research was supported by American Recovery and Reinvestment Act funds through grant DP4GM096822 to M.C. from the National Institute of General Medical Sciences, National Institutes of Health. This publication was

made possible in part by grant numbers R25 GM08352 and R01 GM111002 from the National Institute of General Medical Sciences, National Institutes of Health. B.G. is currently an Advanced Fellow in Women's Health and M.C. is a part-time physician at the William S. Middleton Veterans Hospital. This publication was also made possible in part by a grant from the Gates Millennium Foundation to D.R. We would also like to acknowledge the support and contributions from Kurt Squire, Erin Robinson, John Karczewski, Adam Wiens, Jason Palmer, Allison Salmon, Greg Vaughan, Brian Pelletier, Jake Ruesch, Christine Pribbenow, Angela Byars-Winston, Julia Savoy, Jennifer Sheridan, Eve Fine, Wairimu Magua, Justin Smith, Sterling Pempe, Jackson Reed, Emanuel Rosu, Eric Smith, Stephen Hansen-Sturm, and Susan Millar.

Author Disclosure Statement

None of the authors have any financial interest in the game, "Fair Play," or the outcome of the study, and thus no competing financial interests exist. Data presented were those related to the study's hypothesis. A measure of "engagement" was excluded from the manuscript because of space and its peripheral relationship to the hypothesis. All data are available by request to the corresponding author. The game is available for download on a public-access website.

References

1. Nivet MA, Taylor VS, Strelnick AH, et al. Diversity in academic medicine no. 1 case for minority faculty development today. *Mt Sinai J Med* 2008; 75:491–498.
2. Smedley B, Butler A, Bristow L. *In the Nation's Compelling Interest: Ensuring Diversity in the Health-Care Workforce*. Washington, DC: National Academies Press; 2004.
3. Smedley B, Stith A, Nelson A. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academies Press; 2009.
4. Marrast LM, Zallman L, Woolhandler S, et al. Minority physicians' role in the care of underserved patients: Diversifying the physician workforce may be key in addressing health disparities. *JAMA Intern Med* 2013; 172:289–291.
5. Bonner FA, Bailey KW. Enhancing the academic climate for African American men. In: Cuyjet MJ, ed. *African American Men in College*. San Francisco: Jossey-Bass; 2006: 24–46.
6. Palmer RT, Davis RJ, Hilton AA. Exploring challenges that threaten to impede the academic success of academically underprepared black males at an HBCU. *J Coll Student Dev* 2009; 50:429–445.
7. Pololi L, Cooper L, Carr P. Race, disadvantage and faculty experiences in academic medicine. *J Gen Intern Med* 2010; 25:1363–1369.
8. Pololi LH, Evans AT, Gibbs BK, et al. The experience of minority faculty who are underrepresented in medicine, at 26 representative U.S. medical schools. *Acad Med* 2013; 88:1308–1314.
9. Greenwald A, Krieger L. Implicit bias: Scientific foundations. *Calif Law Rev* 94; 945–967. www.jstor.org/discover/10.2307/20439056?uid=3739976&uid=2&uid=4&uid=3739256&sid=21103934232981 (accessed November 3, 2010).
10. Devine PG. Stereotypes and prejudice: Their automatic and controlled components. *J Pers Soc Psychol* 1989; 56:5–18.
11. Nosek BA, Banaji M, Greenwald AG. Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dyn* 2002; 6:101–115.

12. Nosek BA, Smyth FL, Hansen JJ, et al. Pervasiveness and correlates of implicit attitudes and stereotypes. *Eur Rev Soc Psychol* 2007; 18:36–88.
13. Dovidio JF, Kawakami K, Gaertner SL. Implicit and explicit prejudice and interracial interaction. *J Pers Soc Psychol* 2002; 82:62–68.
14. Greenwald AG, Poehlman TA, Uhlmann EL, et al. Understanding and using the Implicit Association Test III: Meta-analysis of predictive validity. *J Pers Soc Psychol* 2009; 97:17–41.
15. Penner LA, Dovidio JF, West TV, et al. Aversive racism and medical interactions with black patients: A field study. *J Exp Soc Psychol* 2010; 46:436–440.
16. Sabin JA, Greenwald AG. The influence of implicit bias on treatment recommendations for 4 common pediatric conditions: Pain, urinary tract infection, attention deficit hyperactivity disorder, and asthma. *Am J Public Health* 2012; 102:988–995.
17. Greenwald AG, McGhee DE, Schwartz J. Measuring individual differences in implicit cognition: The Implicit Association Test. *J Pers Soc Psychol* 1998; 74:1464–1480.
18. Greenwald AG, Nosek BA, Banaji MR. Understanding and using the Implicit Association Test I: An improved scoring algorithm. *J Pers Soc Psychol* 2003; 85:197–216.
19. Biernat M. Stereotypes and shifting standards: Forming, communicating and translating person impressions. In: Devine PG, Plant EA, eds. *Advances in Experimental Social Psychology*, Vol. 45. San Diego, CA: Elsevier; 2012: 1–59.
20. Hodson G, Dovidio JF, Gaertner SL. Processes in racial discrimination: Differential weighting of conflicting information. *Pers Soc Psychol Bull* 2002; 28:460–471.
21. Bertrand M, Mullainathan S. Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *Am Econ Rev* 2004; 94:991–1013.
22. Reid LD, Radhakrishnan P. Race matters: The relation between race and general campus climate. *Cultur Divers Ethnic Minor Psychol* 2003; 9:263–275.
23. Ancis J, Sedlacek W, Mohr J. Student perceptions of campus cultural climate by race. *J Counsel Dev* 2000; 78: 180–185.
24. Palepu A, Carr PL, Friedman RH, et al. Minority faculty and academic rank in medicine. *JAMA* 1998; 280:767.
25. Ginther DK, Schaffer WT, Schnell J, et al. Race, ethnicity, and NIH research awards. *Science* 2011; 333:1015–1019.
26. Green AR, Carney DR, Pallin DJ, et al. Implicit bias among physicians and its prediction of thrombolysis decisions for Black and White patients. *J Gen Intern Med* 2007; 22:1231–1238.
27. Cooper LA, Roter DL, Carson KA, et al. The associations of clinicians' implicit attitudes about race with medical visit communication and patient ratings of interpersonal care. *Am J Public Health* 2012; 102:979–987.
28. Sabin JA, Nosek BA, Greenwald A, et al. Physicians' implicit and explicit attitudes about race by MD race, ethnicity, and gender. *J Health Care Poor Underserved* 2009; 20:896–913.
29. White-Means S, Dong Z, Hufstader M, et al. Cultural competency, race, and skin tone bias among pharmacy, nursing, and medical students: Implications for addressing health disparities. *Med Care Res Rev* 2009; 66:436–455.
30. Todd A, Galinsky A. Perspective taking undermines stereotype maintenance processes: Evidence from social, memory, behavior, explanation, and information solicitation. *Soc Cogn* 2012; 30:94–108.
31. Teachman BA, Gapinski KD, Brownell KD, et al. Demonstrations of implicit anti-fat bias: The impact of providing causal information and evoking empathy. *Health Psychol* 2003; 22:68–78.
32. Stephan W, Finlay K. The role of empathy in improving intergroup relations. *J Soc Issues* 1999; 55:729–743.
33. Batson CD, Early S, Salvarani G. Perspective taking: Imagining how another feels versus imagining how you would feel. *Pers Soc Psychol Bull* 1997; 23:751–758.
34. Batson CD, Change J, Orr R, et al. Empathy, attitudes, and action: Can feeling for a member of a stigmatized group motivate one to help the group? *Pers Soc Psychol Bull* 2002; 28:1656–1666.
35. Batson CD, Polycarpou MP, Harmon-Jones E, et al. Empathy and attitudes: Can feeling for a member of a stigmatized group improve feelings toward the group? *J Pers Soc Psychol* 1997; 72:105–118.
36. Todd AR, Bodenhausen GV, Richeson JA, et al. Perspective taking combats automatic expressions of racial bias. *J Pers Soc Psychol* 2011; 100:1027–1042.
37. Davis MH, Conklin L, Smith A, et al. Effect of perspective taking on the cognitive representation of persons: A merging of self and other. *J Pers Soc Psychol* 1996; 70:713–726.
38. Galinsky AD, Ku G, Wang CS. Perspective-taking and self-other overlap: Fostering social bonds and facilitating social coordination. *Group Processes Intergroup Relations* 2005; 8:109–124.
39. Gee JP. *What Video Games Have to Teach Us About Learning and Literacy*. New York: Palgrave Macmillan; 2003.
40. Gee JP. Pleasure, learning, video games, and life: The projective stance. In: Lankshear C, Knobel M, Bigum C, Peters M, eds. *New Literacies and Digital Epistemologies*. New York: Peter Lang; 2007: 95–114.
41. Gee JP. Video games and embodiment. *Games Culture* 2008; 3:253–263.
42. Groom V, Bailenson JN, Nass C. The influence of racial embodiment on racial bias in immersive virtual environments. *Soc Influence* 2009; 4:231–248.
43. Drwecki BB, Moore CF, Ward SE, et al. Reducing racial disparities in pain treatment: The role of empathy and perspective-taking. *Pain* 2011; 152:1001–1006.
44. Shih M, Wang, E, Bucher AT. Perspective taking: Reducing prejudice towards general outgroups and specific individuals. *Group Processes Intergroup Relations* 2009; 12:565–577.
45. Galinsky AD, Moskowitz GB. Perspective-taking: Decreasing stereotype expression, stereotype accessibility, and in-group favoritism. *J Pers Soc Psychol* 2000; 78:708–724.
46. Ku G, Wang CS, Galinsky AD. Perception through a perspective-taking lens: Differential effects on judgment and behavior. *J Exp Soc Psychol* 2010; 46:792–798.
47. Peck TC, Seinfeld S, Aglioti SM, et al. Putting yourself in the skin of a Black avatar reduces implicit racial bias. *Consciousness Cogn* 2013; 22:779–787.
48. Smith EMJ. Ethnic minorities: Life stress, social support, and mental health issues. *Counsel Psychol* 1985; 13:537–579.
49. Kanter R. *Men and Women of the Corporation*. New York: Basic Books; 1977.
50. Steinkuehler CA. Learning in massively multiplayer online games. In: Kafai Y, Sandoval W, Enyedy N, et al., eds. *Conference Proceeding: Sixth International Conference of the Learning Sciences*. Mahwah, NJ: Lawrence Erlbaum Associates; 2004: 521–528.

51. Squire K. From content to context: Videogames as designed experience. *Educ Res* 2006; 35:19–29.
52. Squire K. *Video Games and Learning: Teaching and Participatory Culture in the Digital Age*. New York: Teacher's College, Columbia University; 2011.
53. Squire K, Jenkins H. Harnessing the power of games in education. *Insight* 2003; 3:7–31. www.edvantia.org/products/pdf/InSight_3-1_Vision.pdf (accessed July 9, 2010).
54. Zax D. The most influential women in technology 2011—Erin Robinson. 2011. www.fastcompany.com/3016985/women-in-tech-2011/the-most-influential-women-in-technology-2011-erin-robinson (accessed March 26, 2014).
55. Toi M, Batson C. More evidence that empathy is a source of altruistic motivation. *J Pers Soc Psychol* 1982; 43:281–292.
56. Bilewicz M. Perspective taking and intergroup helping intentions: The moderating role of power relations. *J Appl Soc Psychol* 2009; 39:2779–2786.
57. Batson CD, Eklund JH, Chermok VL, et al. An additional antecedent of empathic concern: Valuing the welfare of the person in need. *J Pers Soc Psychol* 2007; 93:65–74.
58. Batson CD, Lishner DA, Cook J. Similarity and nurturance: Two possible sources of empathy for strangers. *Basic Appl Soc Psychol* 2005; 27:15–25.
59. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
60. Nosek BA. Understanding and using the Implicit Association Test II: Method variables and construct validity. *Pers Soc Psychol Bull* 2005; 31:166–180.
61. Nosek B, Greenwald A. The Implicit Association Test at age 7: A methodological and conceptual review. In: Bargh J, ed. *Social Psychology and the Unconscious: The Automaticity of Higher Mental Processes*. New York: Psychology Press; 2006: 265–292.
62. Lane K, Banaji M, Nosek B. Understanding and using the Implicit Association Test IV. In: Wittenbrink B, Schwarz N, eds. *Implicit Measures of Attitudes*. New York: Guilford Press; 2007: 59–102.
63. Batson CD. *The Altruism Question: Toward a Social Psychological Answer*. Hillsdale, NJ: Erlbaum, 1991.
64. Lamm C, Batson CD, Decety J. The neural substrate of human empathy: Effects of perspective-taking and cognitive appraisal. *J Cogn Neurosci* 2007; 19:42–58.
65. National Academy of Engineering and Institute of Medicine, National Academy of Sciences. *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*. Washington, DC: National Academies Press; 2005.
66. Moss-Racusin CA, Dovidio JF, Brescoll VL, et al. Science faculty's subtle gender biases favor male students. *Proc Natl Acad Sci U S A* 2012; 109:16474–16479.
67. Galinsky AD, Ku G. The effects of perspective-taking on prejudice: The moderating role of self-evaluation. *Communication Res* 2004; 30:594–604.

Address correspondence to:

Belinda Gutierrez, PhD
 Center for Women's Health Research
 University of Wisconsin–Madison
 700 Regent Street, Suite 301
 Madison, WI 53715-2634

E-mail: bgutierrez@wisc.edu