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The Impact of the Workshop Activity for Gender Equity Simulation in the Academy (WAGES–Academic) in Demonstrating Cumulative Effects of Gender Bias

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We report experimental evaluation of the Workshop Activity for Gender Equity Simulation in the Academy (WAGES–Academic), a brief, experiential simulation of the cumulative effects of unconscious bias in the academic workplace. We predicted that participants who played WAGES–Academic would demonstrate significantly increased knowledge and retention of gender equity issues in the academic workplace compared with participants in a control condition. Baseline information on general knowledge of workplace gender equity issues was obtained from 1,254 undergraduates. In the second phase, 144 were randomly assigned to complete either WAGES–Academic or a control task, and the immediate effects of the activities were measured. Participants were contacted 7–11 days later to complete an online measure of knowledge retention. Compared with a control condition, WAGES–Academic increased knowledge and retention. This effect occurred irrespective of prior level of sexist beliefs, participant gender, or whether the participant had been on the advantaged or disadvantaged team. Potential use and testing of WAGES–Academic with university faculty and administrators are discussed.

Keywords: experiential learning, gender equity, intervention

Women have made tremendous strides in attaining the doctoral degree since the 1970s. Yet, across all academic fields the proportion of women tenured faculty remains below the proportion of women PhDs available, especially in scientific fields. Despite the fact that women have been at least half of all college undergraduates since 1978, according to the American Association of University Professors (2006), women represent only 25% of all tenured faculty at doctoral-granting institutions, and only 19% of women have achieved the status of full

professor at these universities. And, as has been the case historically, the proportion of women dramatically decreases as a function of academic rank and institutional prestige.

Various factors have been identified that contribute to creating the lag between women's success in obtaining the PhD and their successful advancement to tenure and senior leadership positions. One factor stands out, however, for its almost-invisible operation, namely the cumulative effect of stereotypes and the unconscious biases (i.e., systematic errors in judgment that are due to cognitive processes rather than conscious decision) they promote. Stereotypes are quick and unconscious generalization about an individual based on her or his group membership (Fiske, 1998). Because these judgments are made quickly and not deliberately, their operation is typically hard to notice, identify, or change without active monitoring. In other words, to counteract the effects of unconscious bias, the nature and consequences of that bias need to be made visible.

In this article, we report experimental evaluation of the Workshop Activity for Gender

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Equity Simulation in the Academy (WAGES–Academic), a brief, experiential simulation of the cumulative effects of unconscious bias (<http://wages.la.psu.edu/>) in the academic workplace.

How Unintentional Bias Occurs

Gender-related inequity in the academic workplace persists despite our best efforts to prevent it. By *inequity*, we mean treatment (such as work evaluation, raises, or access to professional opportunity) that is not commensurate with one’s ability or accomplishments. Issues of workplace climate, access to resources, and “fitting in” are commonly reported problems in the academic workplace (Blackwell, Snyder, & Mavriplis, 2009; Goltz, 2005; Kaminski, 2005; Probert, 2005). These issues and incidents of subtle bias tend to occur “under the radar,” escaping attention and correction at the time they occur.

The crux of the problem is that people are not always able to carefully and completely evaluate all information available to them, and they rely instead on stereotypes and heuristics, what can be thought of as *cognitive shortcuts*, much of the time (e.g., Bargh, 1997; Gideon & Teigen, 2004; Kahneman, 2003). These shortcuts make it possible to process large quantities of complex information without becoming caught up in detail; however, they can lead to overlooking information or coming to premature conclusions. How people process social information, especially information about other people, can be heavily influenced by stereotypes. Stereotypes, both positive and negative, can have powerful effects, even when a person does not believe that the stereotypes pertain to his or her own group (e.g., Bonnot & Croizet, 2007; Burkley & Blanton, 2008; Delisle, Guay, Sénécal, & Larose, 2009; Logel et al., 2009; Sinclair, Pappas, & Lun, 2009; Wessel & Ryan, 2008). In sum, people are susceptible to unintentional biases even when they try not to be or may themselves be disadvantaged by them.

Cumulative Effects of Minor Biases

Patterns of inequity can be diffuse and individual incidents may go unacknowledged or be

perceived as inconsequential. Some issues, such as work–family balance, are widely acknowledged, although the affected individual is often asked to change to fix the problem (Brough, O’Driscoll, & Kalliath, 2005; Keene & Reynolds, 2005). Other workplace climate issues, such as a sexist cartoon in the coffee room, may seem minor and occasional. Still others, such as gender bias in salary increases, may even go undetected when they initially occur, although the effects are substantial over the course of a career (Alksnis, Desmarais, & Curtis, 2008; Lips & Lawson, 2009). Cumulatively, these incidents take a considerable toll, particularly in conjunction with other stressors of daily life (Klonoff & Landrine, 1995; Swim, Hayes, Cohen, & Ferguson, 2001). Being in the numerical minority can come with additional disadvantages, including less access to mentoring (Niemann, 2003; Yoder, 2001).

The impact of unconscious bias is not simply additive. Valian (1998) describes how advantages build on one another, like interest on capital, and disadvantages do likewise, like the piling up of interest against debt. Small differences accumulate over time and yield noteworthy disparities in salary and access to professional opportunity and rewards. An important aspect is that the gap widens as small initial setbacks accrue and make future opportunities for success less likely. Even a small systematic bias can have a major impact on advancement (e.g., Martell, Lane, & Emrich, 1996). Thus, creating fair work environments requires vigilance not only against obvious instances of unfairness but also against apparently minor instances of group-based disadvantage. Furthermore, patterns of exclusion and bias feed institutional devaluation of women and women’s performance, making it less likely that women will be chosen for leadership positions (Ferber, 2003; Hollenshead, 2003).

Intervention Through Experiential Learning

Experiential learning in various formats, from simulation exercises to case-based learning, has demonstrated effectiveness with adult learners (e.g., Cantor, 1997; Springer, Stanne, & Donovan, 1997). The framework for our approach is derived from educational research that shows that to develop competence in an area of

inquiry, the learner must not only have a foundation of factual knowledge but also understand facts and ideas in the context of a conceptual framework and organize knowledge in ways that facilitate retrieval and application (Bransford, Brown, & Cocking, 2000). WAGES–Academic engages participants in a sequence of activities that align closely with Kolb’s (1984) widely used experiential learning model, a cycle of four adaptive learning modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The learning process often begins with hands-on experience and, with the help of a skilled facilitator, leads from particulars to overarching concepts and back to specific applications in modified contexts.

WAGES–Academic uses a game-like simulation to condense career advancements that would take years in real life into a brief concrete experience. This experience is apprehended simultaneously by participants who are divided into two teams, one of which has small advantages that eventually make it easy for its members to outperform the other team’s members. However, players initially lack the framework of reference needed to comprehend this experience. In the dissonance created between players’ divergent experiences and their need to conceptualize fully what has happened, a game facilitator invites individual players to think about their current feelings and observations. Then the facilitator leads a group discussion in which players draw on their existing knowledge to move from individual reflection to more abstract issues of fairness and generalizations about advantages and disadvantages of the two teams that symbolically represent different genders. The facilitator ends the discussion by asking participants to think about what they can do in their lives to address bias, for example, discussing follow-up activities in which they can engage. This leads players to predict how they will adapt to the new information and their acceptance of convergent knowledge generated by the group and backed up by research on which the game is predicated.

WAGES–Academic

WAGES–Academic consists of a game play portion followed by a discussion and was inspired by a simpler version of WAGES devel-

oped by the first author for classroom use. It is designed to meet four core learning objectives that build on social psychological research relevant to understanding how unconscious bias operates and can have a cumulative effect, and why the intention to be unbiased does not alone neutralize its operation. Participants learn that (a) accumulation of apparently minor biases and unfair practices hinders advancement; (b) different gender-relevant factors are significant at each stage in work life; (c) stereotypes and other “cognitive shortcuts” impair our ability to notice bias; and (d) patterns, not single incidents, reveal inequities. Although any adult group would be able to understand the work context presented in WAGES–Academic and achieve its learning objectives, the ultimate target audience is postsecondary academic administrators and faculty.

Six individuals are randomly divided into two teams (Green and White). No connection to gender is made in forming teams; the gendered nature of Green versus White team experience emerges over the course of the game and is clarified through postgame discussion. By allowing players to discover bias while they play, the activity demonstrates the impact of cumulative gender bias while minimizing reactivity. Players begin as Assistant Professors and draw cards each turn that depict experiences in academic life (see Table 1). It is important to note that all individual game items are based on multiple empirical research studies or objective demographic data.

Cards tell players how many spaces to advance and how many “credit chips” they earn for this turn. Credit chips represent the lines of one’s curriculum vitae representing scientific and professional achievements. The object of the game is to become the first Distinguished Professor. An instruction manual includes directions for the facilitator and a postgame discussion guide.

Players must both advance forward on the board, which represents the steps on the ladder of advancement, and earn enough chips to be promoted to the next level. However, if players do not have enough credit chips accumulated by the time they reach the Promotion and Tenure space, they must start over (which represents a move to another institution). If they are up for promotion to Full or Distinguished Professor,

Table 1
Sample Workshop Activity for Gender Equity Simulation in the Academy (WAGES–Academic) Items

Level	WAGES–Academic team	
	White	Green
1: Assistant Professor	A senior faculty member congratulates you on your skill in completing a big grant proposal on time. <i>Earn 3 credit chips as you await your reviews. Move 1 space forward.</i>	A senior faculty member congratulates you on your good luck in completing a big grant proposal on time. <i>Earn 2 credit chips as you await your reviews. Move 1 space forward.</i>
2: Associate Professor	The university tries out a “masked” evaluation system. You do just fine and get a good raise. <i>Earn 3 credit chips as you continue to move along. Move forward 1 space.</i>	The university tries out a “masked” evaluation system. Your pay raise this year is better than ever! <i>Earn 3 credit chips as you feel you are gaining ground. Move forward 1 space.</i>
3: Professor	While moving to a new office you realize that other full professors have offices about the same size as yours. <i>Earn 3 credit chips while you feel good about how fair it is. Move 1 space forward.</i>	You realize that your office is smaller than any other full professor. And all of them are White team members. <i>Earn 2 credit chips as you accept that your office is large enough to get all of your work done. Move 1 space forward.</i>

they lose a turn (which represents stalled advancement).

The same standards for advancement are required for all players, but advancement and accumulation of credit chips depend on the game cards, which are team-specific and represent experiences unique to each team. Items cover the gamut of issues that contribute to the pattern of subtle and ambiguous gender bias, including work–family balance, salary, mentoring, workplace climate, and token status. There is a small overall credit advantage for the White team. While the incremental nature of the accumulation of credit may mask underlying group-based inequity early in play, distance grows between the two teams as the game progresses. Green team members have to use more turns to earn additional credit toward advancement, for example, by opting to earn extra credit chips. Although the focus of WAGES–Academic is on gender bias, most of the items also relate to men from underrepresented groups and multiple marginalization of women, as through racial ethnicity or ability status.

Once the first player reaches Distinguished Professor, the game play portion ends and discussion begins. Participants first share their initial observations. Depending on participants’ comments, the facilitator makes clear the purpose of the game and its four learning objectives. The primary way that the facilitator helps to demonstrate the learning objectives is by

asking participants to compare green and white cards for the same situation. Once participants see how the same events are judged differently, or result in more positive benefits for the White team than the Green team, it becomes clear how small biases form a pattern of inequity. Discussion concludes with ways that unconscious bias can be counteracted by the institution (e.g., transparency in promotion criteria) and by individuals (e.g., suggested methods that promote fair evaluation in the promotion and tenure process).

Overview of the Present Study

The purpose of this study was to test whether WAGES–Academic is effective in teaching about the nature and consequences of unconscious biases and stereotyping and how they underlie patterns of gender inequity. This study had three phases. In Phase 1, we obtained baseline information on participants’ knowledge of work-relevant gender equity issues. In Phase 2, participants were randomly assigned to play either WAGES–Academic or a control task, and the immediate effects of the activities were measured. In Phase 3, participants were contacted 7–11 days later and asked to complete an online questionnaire. We predicted that participants who played WAGES–Academic would demonstrate significantly increased knowledge of gender inequity in the workplace compared

with a control condition, and that this knowledge would be retained over time.

For the present study, we used a sample of undergraduate participants. This sample allowed us to conduct a rigorous test of the comparative effectiveness of WAGES–Academic, including randomly assigning participants to the WAGES–Academic or control group, comparing whether prior levels of endorsement of sexism affected WAGES–Academic’s effectiveness, and testing whether participant gender moderated observed effects. Although our ultimate goal with testing WAGES–Academic was to test its effect on faculty and administrators, they are a selective and limited sample to reach. With the current sample, we were able to conduct a cost-effective study to assess whether WAGES–Academic increases knowledge and retention of gender equity issues in the academic workplace. This foundational evidence then provides justification to conduct additional studies with faculty and administrators.

Method

Participants

Participants were undergraduates at a large, northeastern university enrolled in introductory psychology classes who were required to complete a certain number of research hours. In the first phase, all 1,274 students enrolled were sampled as part of a mass screening (693 women, 566 men, 15 gender unspecified; ages ranged from 18 to 55 years, with 95.6% of students being 18–21 years of age, $M = 19.01$ years, $SD = 2.01$).

We contacted a random sample of 468 who had indicated willingness to consider further participation. Of those invited, 30.8% ($n = 144$) agreed to participate in Phase 2 (75 women, 65 men, four nonresponders; ages 18 to 27 years, $M = 19.23$ years, $SD = 1.35$). Phase 2 participants identified themselves predominantly as White, Caucasian (81.3%), followed by Asian American (6.9%), African American (2.8%), and Latino/a (2.1%), with the remaining participants identifying as other or not responding.

Approximately 7 to 11 days after completing Phase 2, participants were invited to participate in Phase 3. Of those invited, 81.9% ($n = 118$) agreed (62 women, 53 men, 3 nonresponders; ages 18–24 years, $M = 19.20$ years,

$SD = 1.25$). Most identified themselves as White, Caucasian (83.9%), followed by Asian American (5.1%), African American (3.4%), and Latino/a (2.5%), with the remaining participants identifying as other or not responding.

To test for selection and attrition effects, we compared participants with nonparticipants on all dependent measures. Phase 1 participants did not differ significantly from nonparticipants on the Knowledge of Gender Equity (KGE) scale, $F(1, 1260) = 0.49, p > .48$, or the Neosexism scale, $F(1, 1267) = 0.39, p > .53$. Phase 3 participants did not differ from nonparticipants on KGE in either Phase 1, $F(1, 140) = 1.40, p > .23$, or Phase 2, $F(1, 142) = 0.26, p > .60$, or on the Neosexism scale, $F(1, 142) = 2.51, p > .11$, in Phase 1.

Materials

The 11-item Neosexism scale (Tougas, Brown, Beaton, & Joly, 1995) was administered in Phase 1 ($\alpha = .86$). It measures the manifestation of conflict between egalitarian values and residual negative feelings toward women (e.g., “I consider the present employment system to be unfair to women” [reverse coded]; “Women’s requests in terms of equality between the sexes are simply exaggerated”). Participants respond using a 1 (*strongly disagree*) to 7 (*strongly agree*) Likert-type scale. Items are averaged (after reverse coding when appropriate), with higher numbers indicating greater endorsement of sexist attitudes.

The KGE scale was administered in Phases 1, 2, and 3. It measures participants’ knowledge about gender equity in the workplace. It was adapted from a 28-item self-report instrument that had been developed for measuring the effectiveness of a different version of WAGES (Zappe, 2006). Individual items were created to map onto WAGES–Academic learning objectives and information on game card items. Reliability for the present study was initially computed using Phase 1 participants. Seven items with item–total correlations less than .30 were deleted, and the resulting 21-item scale (see Table 2) was used in all analyses. The KGE showed high reliability across Phases 1, 2, and 3 ($\alpha = .87, .91, \text{ and } .91$, respectively). Participants respond using a 1 (*very much believe to be true*) to 5 (*very much believe to be false*) Likert-type scale. The score is computed by averaging

Table 2
Knowledge of Gender Equity Questionnaire

1. Men tend to receive larger raises than women.
2. Women are often noticed in the workplace for their personal appearance.
3. Gender has no influence on the results of workplace evaluations.^a
4. Men's common interests with their male bosses help to further their careers.
5. Women who assume the caregiver role at home are viewed to be less serious in their careers.
6. Women tend to have larger offices than male coworkers with the same status.^a
7. Gender inequity is often the result of the accumulation of many small and subtle biases, rather than a large, obvious event.
8. Workplaces tend to view women's careers as being just as important as those of men.^a
9. Gender can influence the salary of men and women.
10. The types of gender inequity a woman experiences vary depending on the stage of her career.
11. Women are often not acknowledged by their male colleagues for their hard work.
12. Women feel pressure to familiarize themselves with traditionally male subjects in order to succeed in the workplace.
13. One factor contributing to gender inequities is the dual role women hold of being a worker and a caregiver.
14. Women and men receive bonuses at equivalent rates.^a
15. Discrepancy in success of men and women in their careers can be explained by the cumulative effect of many small incidents of gender inequity.
16. Women are often chosen for responsibilities at work that fit stereotypical personality characteristics.
17. Men feel equal pressure to balance family and career as do women.^a
18. Men and women receive promotions at an equal rate.^a
19. Behaviors, such as assertiveness, that are perceived to be positive when displayed by men are often perceived as negative when displayed by women.
20. Women are likely to receive as many or more staff assistants as men with equal status.^a
21. Women who report incidents of gender inequity are viewed positively by colleagues.^a

^a Reverse-coded items.

across items (after reverse coding when appropriate), such that higher scores indicate more knowledge.

A single open-ended question in Phase 3 assessed whether participants internalized new ideas about gender bias: "Since you played the game, have you thought about issues or made observations that you might not have before? If so, what are they?" Codable data were provided by 56 of 68 participants. Two research assistants masked to the study's purpose first iden-

tified whether the answer was codable and, if so, classified the topic as one of the following: (a) experiencing and seeing gender bias in the workplace, (b) wanting to learn more about bias and to change it, (c) attributing bias to be the result of minor biases accumulating, or (d) believing that bias is exaggerated. Raters disagreed on only one rating, which was resolved by discussion.

Procedure

Phase 1. Participants completed several questionnaires including the Neosexism scale and KGE. Neosexism was used to select participants of differing levels of sexism endorsement for Phase 2, so as to test whether WAGES-Academic is effective regardless of prior level of endorsement of sexism. The KGE served as the main dependent variable for all three phases.

Phase 2. Participants were told that the purpose of the study was to learn about the dynamics of group interactions. Groups of five to 12 participated in WAGES-Academic or the control condition. Participants were broken into teams with no more than three players on a team. When there were more than six participants in a session, two groups played simultaneously with a combined postgame group discussion. When needed, the facilitator played as a participant to ensure equal numbers on each team. The facilitator participated in only six of 16 groups, and facilitator participation did not influence participants' KGE scores. For all analyses, group size was tested as a covariate, but was not significant, $F(1, 110) = 0.58$, $p > .44$.

Participants in the WAGES-Academic condition played the game and participated in a postgame discussion. Participants in the control condition played Chutes & Ladders, which has elements comparable to WAGES-Academic, such as moving forward and falling behind on a ladder-type board. Postgame discussion in the control condition considered factors that enable groups to work more efficiently together (e.g., having a common goal). Thus, participants addressed differences between groups but did not specifically consider gender as a group. After the postgame discussion, participants filled out demographic information and the KGE.

Sessions were conducted by one of four trained female research assistants. Female re-

search assistants were used to keep facilitator gender constant. Facilitators were trained as outlined in the WAGES–Academic manual. First, they read through the WAGES–Academic manual to understand the components of the WAGES–Academic activity and discussion. Second, they completed background reading on how bias affects women in the workplace and on how to conduct focus groups. For the WAGES–Academic condition, there were no differences across research assistants in participants' KGE scores at Phase 2, $F(3, 74) = 0.42$, $p > .74$, or Phase 3, $F(3, 64) = 0.41$, $p > .74$.

Phase 3. Participants went online to complete the KGE and the open-ended question.

Results

Effectiveness of WAGES–Academic

Our measure of the effectiveness of WAGES–Academic was the extent to which it enhanced knowledge of gender inequity as indicated by KGE scores. To test WAGES–Academic's ($n = 66$) effectiveness compared with the control condition ($n = 47$), we ran a 2 (intervention: WAGES–Academic vs. control) \times 3 (time: Phase 1, Phase 2, and Phase 3) repeated measures analysis of variance (ANOVA), with repeats on the second variable. Results are illustrated in Figure 1. We obtained the predicted significant Condition \times Time interaction, $F(2, 222) = 13.41$, $p < .001$, $\eta_p^2 = .11$. Follow-up analyses revealed that (a) there were no differences between

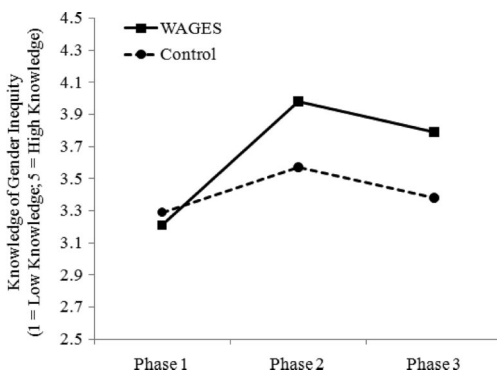


Figure 1. Mean Knowledge of Gender Equity (KGE) scores for Workshop Activity for Gender Equity Simulation in the Academy (WAGES–Academic) and control condition in Phases 1, 2, and 3.

WAGES–Academic ($M = 3.21$, $SD = 0.41$) and the control group ($M = 3.29$, $SD = 0.36$, $p > .31$) in Phase 1, (b) WAGES–Academic ($M = 3.98$, $SD = 0.50$) significantly differed from the control group ($M = 3.57$, $SD = 0.60$) in Phase 2 ($p < .001$, $d = 0.74$), and (c) WAGES–Academic ($M = 3.79$, $SD = 0.50$) significantly differed from the control group ($M = 3.38$, $SD = 0.57$) in Phase 3 ($p < .001$, $d = 0.76$).

Within the WAGES–Academic condition, both Phase 2 ($p < .001$, $d = 1.68$) and Phase 3 ($p < .01$, $d = 1.27$) participants reported significantly more knowledge than those in Phase 1, indicating an increase in KGE scores that was sustained through Phase 3. There was a significant difference between Phase 2 and 3 ($p < .05$, $d = 0.38$), indicating some decline in retention of gender equity information as assessed by the KGE. This decline, however, yielded a relatively small effect size, especially in comparison to the large effect size of the increase in Phase 2 over baseline knowledge.

Within the control condition, although KGE scores significantly increased in Phase 2 over Phase 1 baseline scores ($p < .01$, $d = 0.57$), that increase was not sustained and declined significantly between Phase 2 and Phase 3 ($p < .01$, $d = 0.32$) to Phase 1 levels.

Sexism Scores

As described above, participants were grouped into low, medium, and high endorsers of sexism based on Phase 1 Neosexism scores and then randomly sampled from within these groups. To determine whether WAGES–Academic was equally effective for participants who held differing levels of sexist attitudes, we ran a 3 (sexism grouping) \times 3 (time) repeated measures ANOVA, with repeats on the third variable using KGE as the dependent measure. The interaction between sexism grouping and time was not significant, $F(4, 126) = 1.33$, $p > .26$, indicating no difference among WAGES–Academic condition participants, irrespective of prior level of sexist beliefs.

Participant Gender

We tested whether the effectiveness of WAGES–Academic was moderated by participant gender in a 2 (participant gender) \times 3

(time) repeated measures ANOVA, with repeats on the third variable using KGE as the dependent measure. There was a significant interaction of gender by time, $F(2, 122) = 5.27, p < .01, \eta_p^2 = .08$. Although women ($M = 3.24, SD = 0.40$) and men ($M = 3.14, SD = 0.42, p > .34$) did not differ in Phase 1, women's KGE scores were higher than men's after both Phase 2 ($M = 4.17, SD = 0.42$ vs. $M = 3.80, SD = 0.53; p < .01, d = 0.77$) and Phase 3 ($M = 4.06, SD = 0.45$ vs. $M = 3.53, SD = 0.41; p < .001, d = 1.23$). However, men's knowledge significantly increased in Phase 2 as a result of playing WAGES-Academic ($p < .001, d = 1.38$), and this knowledge was retained at Phase 3, remaining significantly higher than Phase 1 ($p < .002, d = 0.94$). The same pattern held for women (Phase 1 vs. Phase 2: $p < .001, d = 2.27$; Phase 1 vs. Phase 3: $p < .001, d = 1.93$).

Green Versus White Team

To determine whether WAGES-Academic was equally effective for Green team and White team members, we ran a 2 (team: Green vs. White) \times 3 (time) repeated measures ANOVA, with repeats on the second variable using KGE as the dependent measure. The two-way interaction between team and time was not significant, $F(2, 122) = 0.45, p > .63$, indicating that WAGES-Academic was equally effective for members of both Green and White teams.

Phase 3 Open-Ended Question

Of 56 codable responses, 24 (42.86%) participants responded that they had thought about or made observations related to issues raised by WAGES-Academic. Of these participants, 15 (62.5%) wrote about seeing and experiencing gender bias in the workplace. For example, one participant wrote, "I've noticed that women where I work are sometimes viewed as inferior. I work in food service, so some of the female cooks are 'watched over' by the male cooks." Another wrote, "I have noticed how my boss at work actually speaks to male workers and female workers different, talking more like a friend to male workers and a boss to female workers." Other participants noted observing bias on TV and in classrooms.

Another five (20.83%) participants wrote about wanting to learn more about bias and to change it. Echoing one of the main points of the game, one participant wrote, "I thought more actively about how easy it is for people to miss this issue since many people think it is nonexistent in the first place." The remaining four participants were generally unsure about bias. Coded as having some reactance, one participant wrote, "I have thought about the issues, but haven't decided whether or not I believe them. Perhaps when I get into the workplace I will see it. In the academic environment I feel extremely equally treated."

Of the people who said they had not thought about bias since they played, many responded that it was because they were not currently in the workforce. For example, one participant wrote, "Because I am not currently working, I have not been in a situation where I would see anything about these issues, nor have I seen them from an outside view at a restaurant or [elsewhere]." In the same vein, another participant wrote, "I have not, but I am sure as I start working again this summer, I will be more aware of sexism issues in my workplace than I was before."

Discussion

Using a controlled, experimental design, we found that WAGES-Academic increased undergraduates' knowledge of gender equity that was maintained at least 1 week. Furthermore, KGE scores in the WAGES-Academic condition increased irrespective of prior level of sexist beliefs, participant gender, or whether on the advantaged or disadvantaged team. Because participants completed the KGE on three occasions, it could be argued that repeated testing accounts for the sustained positive effects; however, only the WAGES-Academic group showed a sustained increase, whereas the control group's KGE scores declined significantly from Phase 2 to Phase 3, returning to the Phase 1 level.

The next step is to test the effectiveness of WAGES-Academic with our target population of academic faculty and administrators. We expect WAGES-Academic to be as effective, but there are clear differences between the groups that future studies must address. One difference is that university faculty and administrators will

likely be limited to quasi-experimental settings. Another is that undergraduates with limited work experience were likely to be learning about unconscious bias and its broad and long-standing effects for the first time. Faculty and administrators are more likely to be aware of the issues and, for some, WAGES–Academic may validate experiences or observations and provide a platform to discuss these issues. It is important that many of the undergraduates found it difficult to identify specific actions that would enable them to act on what they had learned, whereas we expect that faculty and administrators should be able to identify interventions more readily.

With every test case of WAGES–Academic, the diversity of our sample increases to the extent that we can keep the conditions of play as stable as possible. With each test showing consistent results on participants, we increase our confidence about generalizing results to our target population, even if that population constitutes only a small fraction of the sample. The accumulating data, to the extent that they are consistent, can be used to persuade academic administrators to grant investigators access to faculty in targeted contexts (e.g., department-sponsored workshops), where WAGES–Academic can be engaged by the full spectrum of faculty, and effects measured within parameters allowed by the administrator or administrative committee authorizing the activity.

The study reported here shows that WAGES–Academic is effective in increasing *knowledge* about workplace gender equity issues; however, the ultimate goal of WAGES–Academic is to influence *behavior* of academic decision makers. Behavioral measures demonstrate the application of knowledge about unconscious bias to improving practices related to hiring, evaluation, advancement, and retention. Thus, our current projects are assessing the extent to which WAGES–Academic affects both behavioral intention and actual behaviors that promote gender equity, such as actively seeking equity-relevant information as a basis for faculty recruitment and retention and other work practices that can have profound effects on women's opportunities for advancement and recognition. For example, WAGES–Academic should help individuals understand how teaching and performance evaluations can be influenced by unconscious bias. In addition, the effectiveness of

WAGES–Academic must be measured over longer periods of time to determine whether periodic booster sessions are needed to maintain attention to the influence of unconscious bias.

In summary, finding ways to counteract the occurrence of unconscious bias that cumulatively hinders women's advancement in the academy is a challenging and ongoing task. Strong and successful programs are currently available to educate academic decision makers about the nature and operation of the cumulative effects of nominally insignificant disadvantages (see <http://www.portal.advance.vt.edu/> for examples). WAGES–Academic offers a portable, low-cost alternative method of using experiential learning as the foundation for achieving that goal, and additionally has the advantage of being easy to administer and applicable to use in diverse academic settings.

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