Gender Equity Workshops for STEMM Departments at IUPUI

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Study Purpose and Design

- The purpose of this study was to create and evaluate hybrid online + live department workshops to address issues regarding gender bias and gender equity in STEMM academic departments in an effort to create a welcoming campus climate for both female and male faculty and staff in these disciplines.
- The sample frame consisted of academic departments in the Schools of Engineering and Technology and Informatics and Computing, social science departments in the School of Liberal Arts, and basic science departments in the IU School of Medicine. This consisted of a total of 24 departments. Of those, 12 were randomly assigned to be in one of three experimental groups and 12 were randomly assigned to be in the control group.
- Departments in the Experimental groups were randomly assigned to be one of three conditions pertaining to the online portion of the study:
    - Narrative videos + information module: participants viewed 2 approximately 5-minute enactments of gender bias in a STEM context. One enactment depicted a search committee meeting where a male candidate with weaker credentials than a female candidate is favored by the male members of the search committee. The second enactment depicted a wet lab where a professor is looking for "the microscope expert" assuming the expert is a male graduate student. The actual expert is a female graduate student. A follow-up PowerPoint presentations provides an overview of the forms and consequences of gender bias in STEM.
    - Expert videos = information module: Participants view 2 approximately 5-minute videos of an interview with a (male) professor who is an expert on gender bias in STEM. In the first interview the professor discusses the research on ….; in the second interview, the profess discusses research on…. A follow-up PowerPoint presentations provides an overview of the forms and consequences of gender bias in STEM.
    - Informational module only: Participants viewed a PowerPoint presentations provides an overview of the forms and consequences of gender bias in STEM.
- To evaluate the effectiveness of these workshops and their variations, we developed online surveys measuring a number of attitudinal, cognitive and behavioral intention measures addressing gender bias and equity in STEMM academic environments. Examples of topics measured include:
    - Bias Awareness ("Women in science fields often are not taken as seriously as their male colleagues").

- Knowledge of Gender Equity ("Behaviors, such as assertiveness, that are perceived to be positive when displayed by men are often perceived as negative when displayed by women.")
- Personal Awareness of Bias ("I need to be aware that gender might influence my evaluations of others.")
- Modern sexism ("discrimination against women is no longer a problem in the United States).
- Self Efficacy to Combat Gender Bias ("I feel confident in my ability to combat gender bias in STEMM and academia generally")
- Self Efficacy to Notice Gender Bias ("I feel confident in my ability to recognize instances of gender bias")
- Behavioral Intention to Create a Welcoming Environment ("I intend to create an environment that ensures both female and male colleagues feel welcome in my department")
- Perspective Taking ("I find it easy to see things from the "other guy's" point of view)
- Belonging ("I belong in STEMM and academia generally")

- General attitudes toward working at IUPUI and measures of mood were also assessed.
- The following figure depicts the study design and dissemination of survey measures:

Survey Administration	Experimental Groups	Control Groups[x]
Pretest 1 (two weeks before department workshop)	X	X
Online Workshop: Narrative video depicting gender bias + informational PowerPoint module on gender bias.	1/3	
Online Workshop: Expert interview video discussing gender bias research + informational PowerPoint module on gender bias.	1/3	
Control Online Workshop: Informational PowerPoint Module on gender bias	1/3	
Pretest 2 (after completing online workshop, before department workshop)	X	
Department Workshop with Two Facilitators covering Bias Reduction and Gender Equity Strategies	X	
Post test 1: One week following Department Workshop	X	X
Post test 2: Three months following Department Workshop	X	X

[x]Each control department was yoked to an experimental group department so that timing of survey dissemination was equal.

Response rates

Department	2 Week Pre-Test	1 Week Pre-Test (Post Online)	1 Week Post-Test	3 Month Post-Test
SoET - Department 1 - Experimental	50.00%	55.56%	33.33%	27.78%
SoET - Department 1 - Control	38.71%		16.13%	12.90%
SoET - Department 2 - Experimental	75.00%	60.71%	25.00%	25.00%
SoET - Department 2 - Control	21.05%		26.32%	36.84%
SoET - Department 3 - Experimental	84.62%	84.62%	69.23%	38.46%
SoET - Department 3 - Experimental	73.33%		60.00%	20.00%
SoIC - Department 4 - Experimental	35.71%	35.71%	21.43%	7.14%
SoET- Department 4 - Control	38.89%		50.00%	33.33%
SoIC - Department 5 - Experimental	35.48%	41.94%	32.26%	32.26%
SoIC - Department 5 - Control	66.67%		0.00%	44.44%
IUSM - Department 6 - Experimental	66.67%	70.00%	0.00%	30.00%
IUSM - Department 6 - Control	51.02%		46.94%	24.49%
IUSM - Department 7 - Experimental	28.57%	42.86%	25.00%	7.14%
IUSM - Department 7 - Control	17.65%		0.00%	5.88%
IUSM - Department 9 - Experimental	2.56%	5.13%	Department Withdrew	
IUSM - Department 9 - Control	25.81%		12.90%	6.45%
IUSM - Department 10 - Experimental	52.56%	43.59%	24.36%	23.08%
IUSM - Department 10 - Control	69.23%		15.38%	30.77%
SLA - Department 11 - Experimental	70.00%	80.00%	70.00%	50.00%
SLA - Department 11 - Control	57.14%		14.29%	14.29%

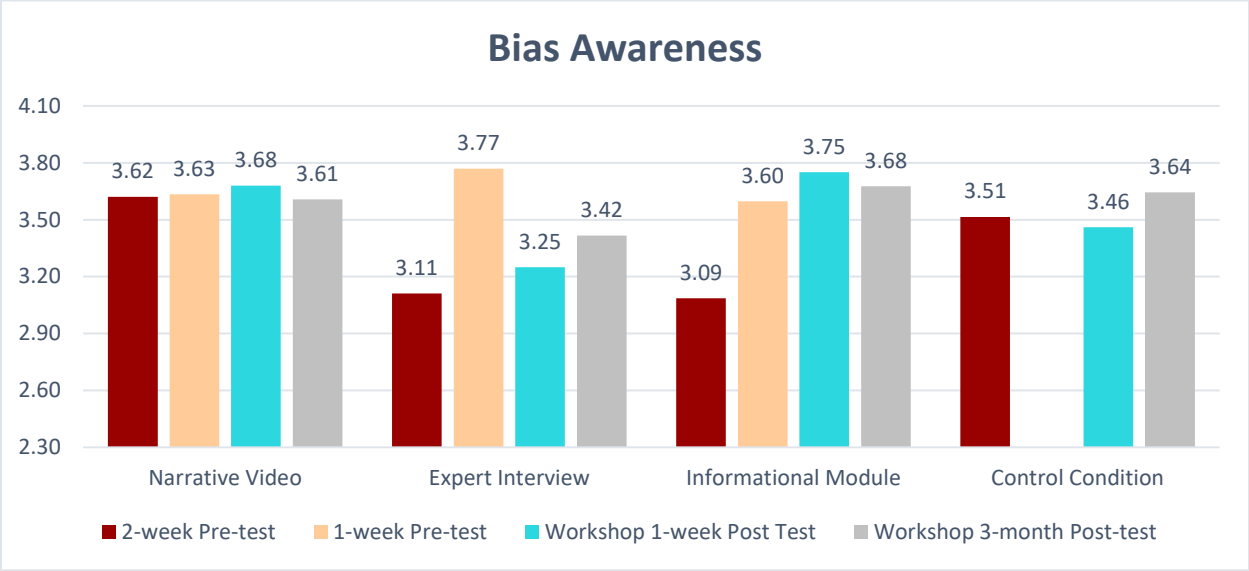
Selected Preliminary Findings

- We have begun to look at the average responses to survey scales to examine trends. The following graphs display the means of the awareness- and behavior- based survey measures by Group and Time. We have run preliminary statistical analyses focusing on the pre-test, online training post-test, the workshop 1- week post-test, and the 3-month post-test. We are specifically examining changes from baseline (i.e., did the intervention increase or decrease the outcome measures).
- Because of our lower than anticipated responses, the results are easiest to interpret when we collapse across all three experimental conditions.

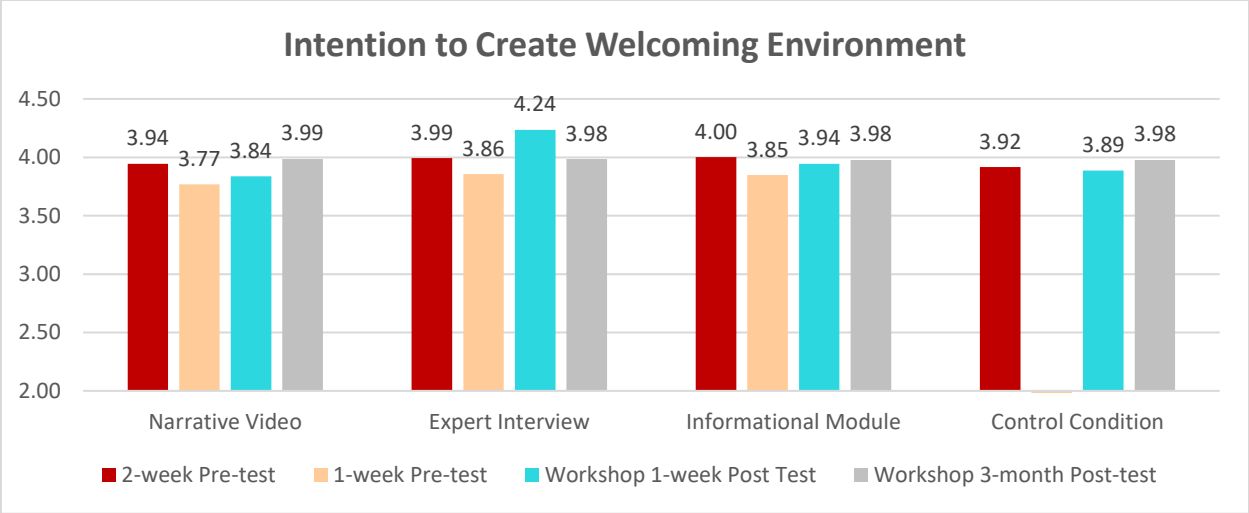
Summary of Preliminary findings

- Relative to baseline, the online training increased awareness of bias, knowledge of gender equity, awareness of personal bias, and self-efficacy to notice bias. As expected, we did not see any significant changes in the control condition on these outcomes. The in-person workshop did not significantly increase awareness of bias, knowledge of gender equity, awareness of personal bias, and self-efficacy to notice bias. Thus, the online trainings may be sufficient to impact these outcomes.
- Relative to baseline, the online workshop not only failed to increase self-efficacy to combat gender bias, but it actually *decreased* self-efficacy to address gender bias. The online training only discussed the harmful nature of bias, but did not describe how to combat it. However, the in-person workshop (which outlined beneficial techniques for combating bias) increased participants' self-efficacy to combat bias relative to baseline. We did not see any significant changes in the control condition on this outcome.

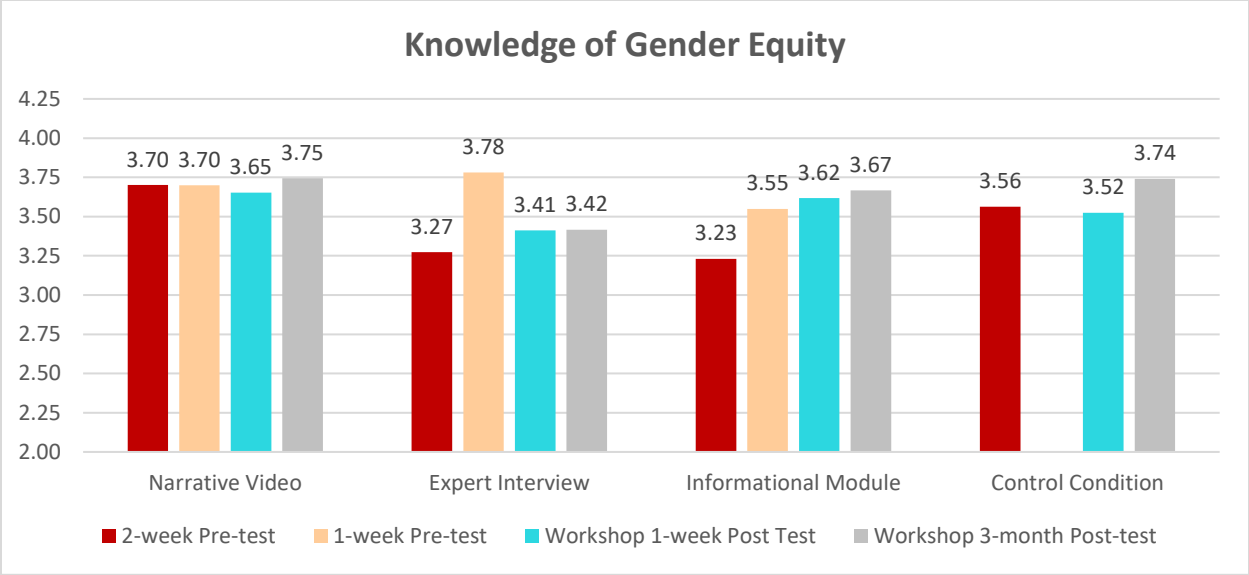
Detailed Descriptions of Preliminary Findings



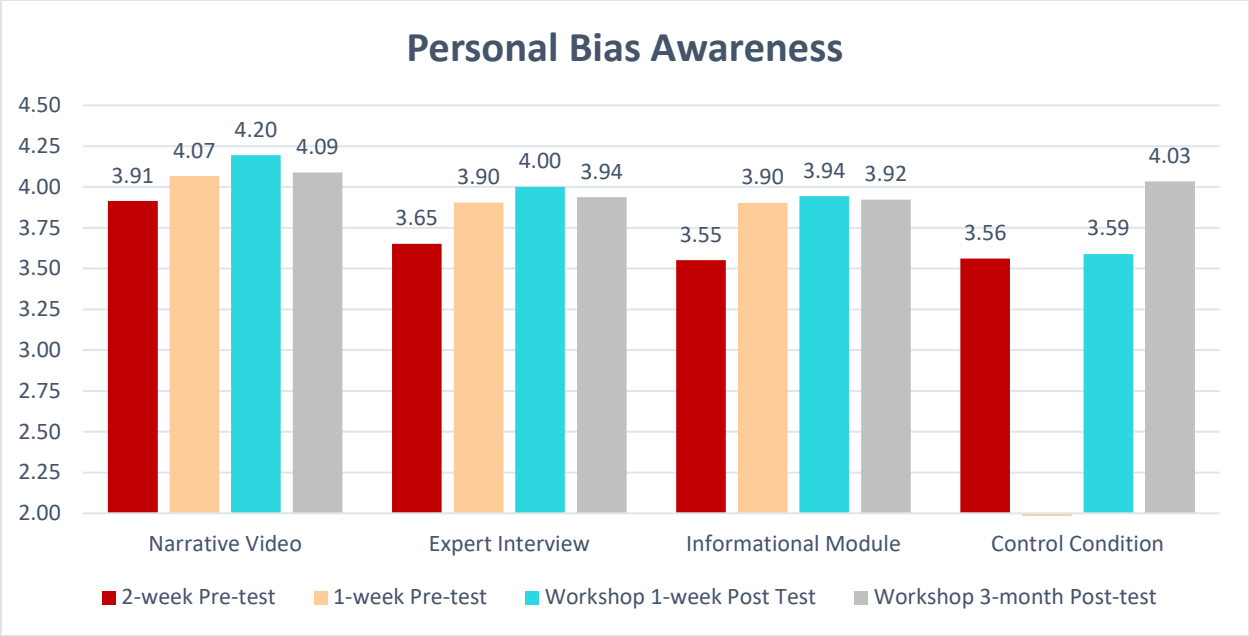
- We first collapsed across the three experiment conditions and compared these conditions to the control condition.
    - Relative to the scores at baseline, the control condition did not show a significant increase in awareness of bias at the one week post workshop or the three-month follow-up.
    - Compared to the scores at baseline, the experimental conditions showed a significant increase in awareness of bias at the one week post workshop *and* at the three-month follow-up.
- We ran additional analyses exploring changes from baseline in the three experimental conditions collapsed. We found that relative to baseline, at the post-test immediately following the online training, there was a significant increase in awareness of bias. The workshop did not further enhance awareness of bias. That is, there was no significant difference between the online training post-test and the one-week post-test (after the workshop) or the three-month post-test.
- We next looked at the three online workshop conditions separately across the 4 time points.
    - Relative baseline, the expert interview marginally and no video condition significantly increased awareness of bias at the online training post-test. Although the narrative condition showed an increase, this change was not significantly different from the pre-test. At the workshop 1- week and three-month post-test only the no video condition showed a significant increase compared to baseline.
    - Additional analyses show that in the experimental conditions, there was no significant differences between these three conditions at the online post-test, workshop 1-week post-test, and three-month post-test.
- **Conclusion: The online training was sufficient to increase awareness of gender bias, and the in-person workshop did not further enhance this awareness. When collapsing across all three experimental conditions, we see these effects persist for 3-months after the online training.**



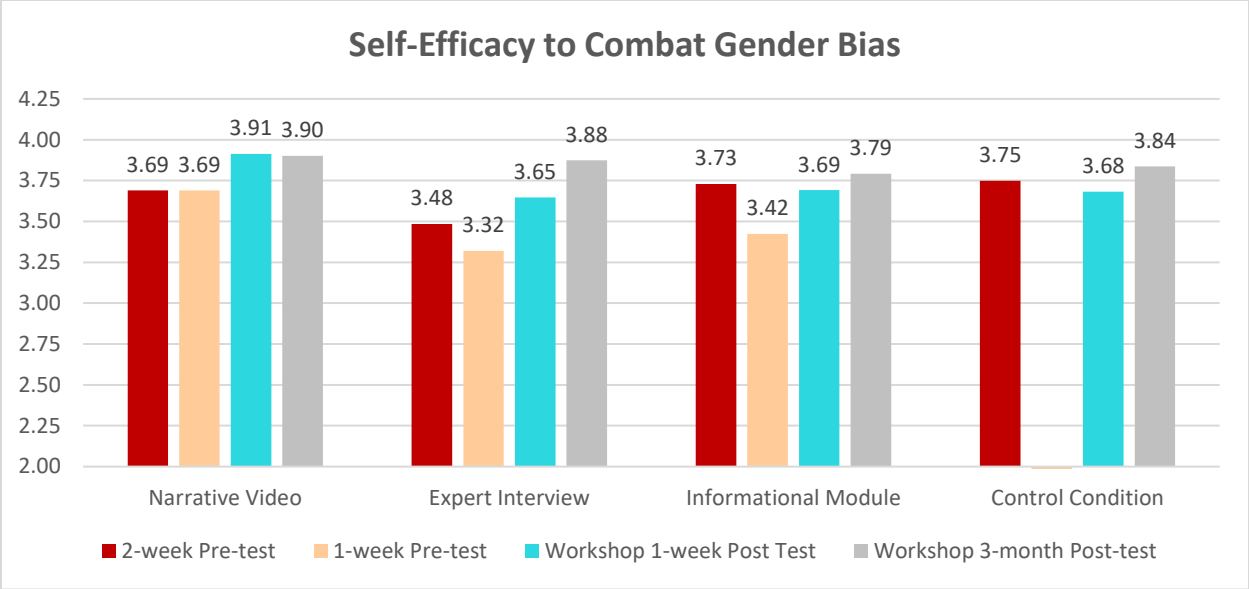
- No discernable trends are noticed in intentions to create a welcoming environment. However, the mean levels of these intentions are relatively high (around 4 on a 5-point scale).
- There were no significant changes from baseline across any of the conditions.



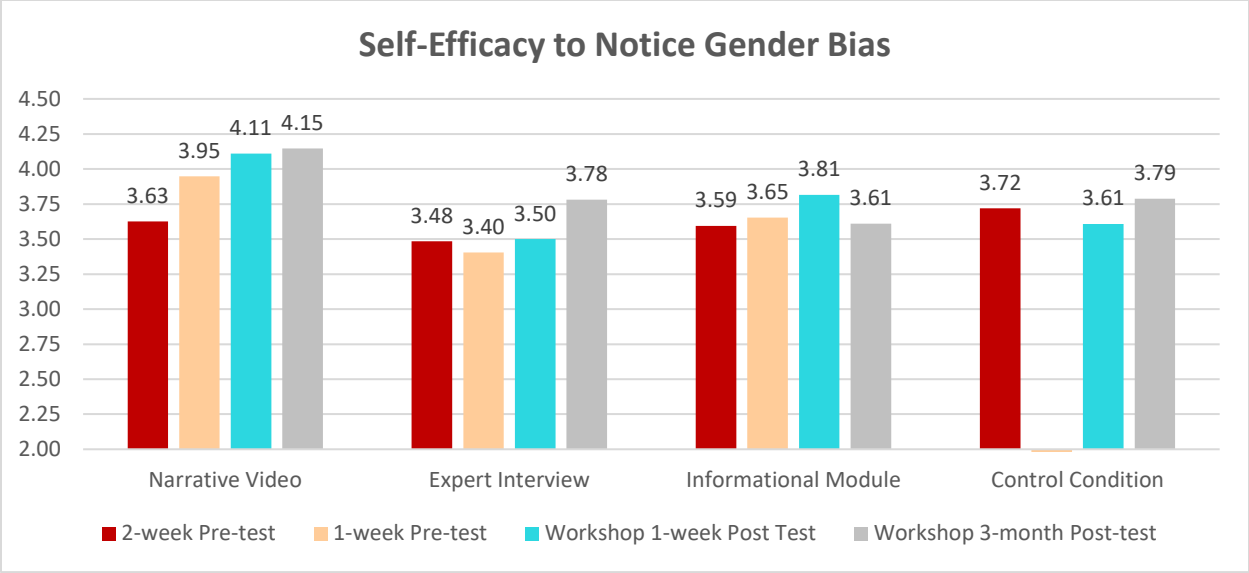
- We first collapsed across the three experiment conditions and compared these conditions to the control condition.
    - Relative to the scores at baseline, the control condition did not show a significant increase in knowledge of gender equity at the one week post workshop or the three-month follow-up.
    - Compared to the scores at baseline, the experimental conditions showed a significant increase in knowledge of gender equity at the one week post workshop *and* at the three-month follow-up.
- We ran additional analyses exploring changes from baseline in the three experimental conditions collapsed. We found that relative to baseline, at the post-test immediately following the online training, there was a significant increase in knowledge of gender equity. The workshop did not further enhance knowledge of gender equity. That is, there was no significant difference between the online training post-test and the one-week post-test (after the workshop) or the three-month post-test.
- We next looked at the three online workshop conditions separately across the 4 time points.
    - Relative baseline, the expert interview marginally and no video condition significantly increased awareness of bias at the online training post-test. At the workshop 1- week and three-month post-test only the no video condition showed a significant increase compared to baseline.
    - Additional analyses show that in the experimental conditions, there was no significant differences between these three conditions at the online post-test, workshop 1-week post-test, and three-month post-test.
- **Conclusion: The online training was sufficient to increase knowledge of gender equity, and the in-person workshop did not further enhance this knowledge. When collapsing across all three experimental conditions, we see these effects persist for 3-months after the online training.**



- We first collapsed across the three experiment conditions and compared these conditions to the control condition.
    - Relative to the scores at baseline, the control condition did not show a significant increase in awareness of personal bias at the one week post workshop or the three-month follow-up.
    - Compared to the scores at baseline, the experimental conditions showed a significant increase in in awareness of personal bias at the one week post workshop *and* at the three-month follow-up.
- We ran additional analyses exploring changes from baseline in the three experimental conditions collapsed. We found that relative to baseline, at the post-test immediately following the online training, there was an increase in personal awareness of bias (but it was not significant). However, this difference was significant at one week post-test and three-month post-test. The workshop therefore may have slightly enhanced awareness of personal bias. However, there was no significant difference between the online training post-test and the one-week post-test (after the workshop) or the three-month post-test.
- We next looked at the three online workshop conditions separately across the 4 time points.
    - Relative baseline, the no video condition did not significantly increased awareness of personal bias at the online training post-test, but did increase awareness of personal bias at the workshop 1- week and three-month post-test.
    - Additional analyses show that in the experimental conditions, there was no significant differences between these three conditions at the online post-test, workshop 1-week post-test, and three-month post-test.
- **Conclusion: The online training increased awareness of personal bias, and the in-person workshop may have slightly enhanced this awareness. When collapsing across all three experimental conditions, we see these effects persist for 3-months after the online training.**



- We first collapsed across the three experiment conditions and compared these conditions to the control condition.
    - Relative to the scores at baseline, the control condition did not show a significant increase in self-efficacy to combat bias at the one week post workshop or the three-month follow-up.
    - Compared to the scores at baseline, the experimental conditions showed a marginal increase in self-efficacy to combat bias at the one week post workshop *and significant increase* at the three-month follow-up.
- We ran additional analyses exploring changes from baseline in the three experimental conditions collapsed. We found that relative to baseline, at the post-test immediately following the online training, there was a *decreased self-efficacy*. However, after the in-person workshop, self-efficacy to combat bias *increased* and was significantly different from baseline at the 3-month post-test.
- We next looked at the three online workshop conditions separately across the 4 time points.
    - Relative baseline, the no video condition did not significantly *decreased* self-efficacy to combat bias awareness of personal bias at the online training post-test, but did increase awareness of personal bias at the workshop 1- week and three-month post-test.
- **Conclusion: The online training increased awareness of personal bias, and the in-person workshop may have slightly enhanced this awareness. When collapsing across all three experimental conditions, we see these effects persist for 3-months after the online training.**



- We first collapsed across the three experiment conditions and compared these conditions to the control condition.
    - Relative to the scores at baseline, the control condition did not show a significant increase in self-efficacy to notice bias at the one week post workshop or the three-month follow-up.
    - Compared to the scores at baseline, the experimental conditions showed a significant increase in in self-efficacy to notice bias at the one week post workshop *and* at the three-month follow-up.
- We ran additional analyses exploring changes from baseline in the three experimental conditions collapsed. We found that relative to baseline, at the post-test immediately following the online training, there was an increase in self-efficacy to notice gender bias (but it was not significant). However, this different was significant at the three-month post-test. The workshop therefore may have slightly enhanced self-efficacy to notice bias. However, there was no significant difference between the online training post-test and the one-week post-test (after the workshop) or the three-month post-test.
- We next looked at the three online workshop conditions separately across the 4 time points.
    - Relative baseline, the narrative marginally and expert interview condition significantly increased self-efficacy to notice gender bias at the three-month post-test.
- **Conclusion: The online training increased self-efficacy to notice bias, and the in-person workshop may have slightly enhanced this self-efficacy to notice bias. When collapsing across all three experimental conditions, we see these effects persist for 3-months after the online training.**

Remaining Tasks

Remaining analysis: We will continue to conduct analyses on all of our outcome variables. For instance, we measured participants' initial reactions to the online trainings. We plan to assess whether participants' reactions (both positive and negative) varied depending on which online training condition (narrative vs. expert vs. no video) they completed. We also intend to employ more sophisticated analyses, which will allow us account for missing data across the time points. Additionally, we will run tests exploring whether workshop improved departmental climate in the months following the workshop.

Writing up-results: We plan to write-up these results for a White Paper, which will be published online and be open access.

Applying for grant funding to sustain the training: We plan to use the results from this study as pilot data for larger ADVANCE grant through NSF. This grant will provide resources to implement training on a larger scale at IUPUI.

Preliminary Recommendations

Across the majority of our measures, we found that relative to baseline, the experimental conditions significantly increased positive outcomes (e.g., awareness of bias, self-efficacy to notice and combat gender bias). In contrast, we did not see any significant changes in the control condition. The online workshop was sufficient to help teach participants about gender bias (e.g., raised awareness of bias, increase participants' ability to notice subtle bias). However, the in-person workshop was critical for teaching participants how to combat gender bias, and increasing participants' self-efficacy to combat these biases. Not only did the online workshop not help self-efficacy to combat gender bias, it actively harmed self-efficacy to address gender bias. Thus, moving forward it will be imperative to combine the information presented in both the online and in person workshop.

Previous work has found that individuals (including academic scientists) can be taught how to combat gender bias and encouraged to feel self-efficacious to combat gender bias using an online training module (Hennes et al., 2018).[1] In order to save time and resources (e.g., having to train workshop facilitators), it may be helpful to create an online version of the in-person workshop. By converting the workshop to a completely online training, it will be easier to implement across departments at IUPUI. However, tools such as a list of "tips" for department chairs to monitor and address potential equity issues or ways to lead discussions about gender (and other dimensions of diversity) equity in department meetings will be helpful to help assure transfer of learning from the online training to department culture. We also recommend holding periodic discussions with department chairs in a safe learning environment where questions about addressing gender (and other) equity and be openly discussed.

[1] Hennes, E. P., Pietri, E. S., Moss-Racusin, C. A., Mason, K. A., Dovidio, J. F., Brescoll, V. L., ... & Handelsman, J. (2018). Increasing the perceived malleability of gender bias using a modified Video Intervention for Diversity in STEM (VIDS). *Group Processes & Intergroup Relations*, *21*, 788-809.