

# Using Persuasion to Promote a More Hospitable STEM Work Climate

Tamera Schneider, Emily Polander, Andrea Jarosz, Rebecca Riffle, Sarah Jackson, & David Goldstein  
Wright State University



## NSF ADVANCE LEADER Consortium (AFIT, CSU, UD, WSU) - Objectives:

- Conduct a comparative analysis of the STEM climate
- Conduct assessments of unconscious bias workshops
- Conduct persuasion research to promote new norms of expectation



### Abstract

The biobehavioral model of persuasion was used to investigate attitudes toward STEM women faculty. STEM undergraduates received a challenge, threat, or standard message. Messages interacted with recipient sex to influence attitudes. Behavior was encouraged in a practical way (although *ns*) by different messages. Different messages can help to warm the STEM workplace climate.

### Introduction

Women are underrepresented in science, technology, engineering and mathematics (STEM). This is evidenced in academic training, hiring, advancement, and retention. This research investigated message effects on attitudes and behavior toward women STEM faculty.

The biobehavioral model of persuasion (Schneider et al., 2009) posits that challenging messages – those evoking some personal concern and high efficacy, will be more persuasive than threatening messages – those evoking greater personal concern and less efficacy. Challenging messages should evoke more message processing, physiological approach tendencies, favorable attitudes, and engage behaviors, relative to threatening or standard (NAS, 2007) messages.

### Method

120 STEM undergraduates assigned randomly to one message (sample statements below):

NAS/Standard	Challenge	Threat
<b>Concern:</b> Women make up only 1/5 of the nation's scientific and technical workforce.	<b>Concern:</b> Women make up 1/5 of the nation's scientific workers.	<b>Concern:</b> Women make up a <i>scant</i> 1/5 of the nation's scientific workers.
<b>Efficacy:</b> Academic leaders should confront biases and support local senior faculty, male and female, who advocate for fair treatment.	<b>Efficacy:</b> Men and women scientists <i>deserve</i> the same amount of respect, opportunity, and departmental collegiality.	<b>Efficacy:</b> Academic leaders <i>must</i> confront faculty and others who are <i>abusive</i> to students, staff, and faculty.

### Procedure

- Baseline measures, message exposure, manipulation checks, attitudes, behavior

Design = 2 (Sex: f, m) x 3 (Message: Challenge, NAS, Threat)

### Results

Experimenter effect – pts interacting with 1 RA had less interest in messages ( $n = 14$ ), pts endorsing extreme discrimination risk ( $n = 5$ ) were also excluded.  $N = 102$ , 57% women.

Baseline differences (covariates):

- Trait anxiety (women > men), state anxiety (NAS > challenge and threat), and risk of gender discrimination (women > men; challenge > NAS and threat; women given challenge > men given NAS)

### Manipulation checks

Concern – 2-item agreement that message raised concern about STEM gender discrimination ( $r = .73$ ).

- Sex x Message interaction,  $F(2,93) = 4.21, p < .05$   
Men given a NAS message reported less concern than the other conditions.

Efficacy – 3-item agreement that message presented ways to reduce STEM gender discrimination ( $\alpha = .83$ ).

- Main effect of Message,  $F(2,93) = 5.82, p < .01$   
Challenge evoked higher efficacy beliefs than NAS and threat messages.

### Hypothesis testing

#### Post-message attitudes:

Seriousness of gender discrimination in STEM (5 items,  $\alpha = .77$ ).

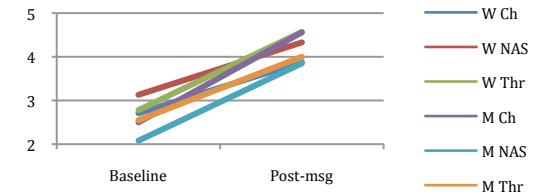
- Sex x Message interaction,  $F(2,93) = 3.51, p < .05$ .  
Men given a challenge message thought the issue of gender discrimination in STEM was more serious than their female counterparts.

	Challenge	NAS	Threat
Women	3.66 (.74)	4.19 (.67)	4.07 (.58)
Men	4.20 (.54)	3.80 (.69)	4.07 (.60)

### Attitude Change:

Baseline concern for workplace gender discrimination vs. post-message agreement that gender equality is critical for US success in STEM (1 item; 5-point agreement ratings).

- Main effect of Time (see Figure below)
- Sex x Message interaction - marginal,  $F(2,88) = 2.33, p = .10$ .  
Post-attitudes exploratory simple effects: challenged men have stronger attitudes than women (baseline, *ns*), threatened women have stronger attitudes than men (baseline, *ns*), NAS, *ns* (baseline, men < women).



### Behavior:

- ns*, practical significance - donating time appears highest in challenge (> 1hr), less in NAS (< 1 hr), least in threat (< ½ hr).

	Challenge	NAS	Threat
Women	1.15 (2.28)	1.37 (2.06)	.54 (1.38)
Men	1.06 (3.61)	.29 (.73)	.00 (.00)

### Discussion

Compared to women, men exposed to a challenge message thought gender discrimination in STEM is more serious, and were more persuaded that gender equality is critical for US success. Threat messages convinced women in this regard. Challenging messages appeared to be better at getting promises of time from students, but should be further examined. Notably, the NAS message did not stand out to change attitudes or facilitate behavior. Given limited resources, challenging messages appear the best for facilitating attitude change (particularly for men) and tempting behaviors.

### References

- National Academy of Sciences (NAS). (2007). *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*. Washington, D.C.: National Academies Press.
- Schneider, T.R., Lyons, J.B., & Rivers, S.E. (2009). The biobehavioral model of persuasion: Generating challenge appraisals to promote health. *Journal of Applied Social Psychology, 39*, 1928-1952.