Gender Bias in Science Education

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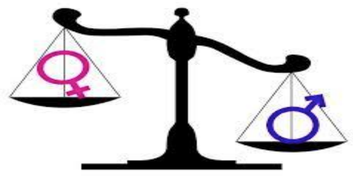


Background

The third Millenium Development Goal is directed at achieving gender equality and women's empowerment around the world. Improvement of equal educational opportunity contributes to the women's empowerment. Women have traditionally had limited access to higher education. When women were admitted higher education, they were encouraged to major in less-intellectual subjects; the study of English literature in American universities was instituted as a field considered suitable to women's "lesser intellects."

How Stereotypes Impair Women's Careers in Science

In *How Stereotypes Impair Women's Careers in Science*, it talks about how women outnumber men in undergraduate enrollment but they are much less likely than men to major in mathematics or science related majors.

Both male and female subjects/recruiters are twice more likely to hire a man than women. Men tend to boast about their performance, whereas women generally under report it.

When the employer had no information other than candidates' physical appearance, women were only half as likely to be hired as men, because they were (erroneously) perceived as less talented for the arithmetic task. Both men and women expected women to perform worse.

Confronting Math Stereotypes in the Classroom

In *Confronting Math Stereotypes in the Classroom,* the articles suggests that students prefer the behavior of positive response to negative attitude towards sexism in the classroom. While *How Stereotypes Impair Women's Careers in Science* suggests that sexism truly exist in the scientific research area, the *Confronting Math Stereotypes in the Classroom* proposes a preferred attitude towards the problem from the perspective of students.

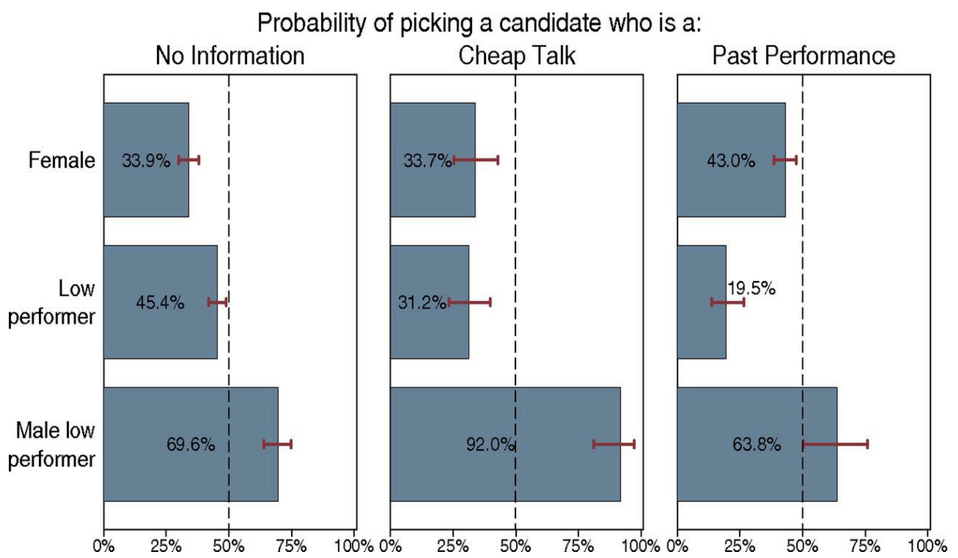
Science Faculty's Subtle Gender Biases Favor Male Students

This paper talks about gender bias against women in scientific research-intensive universities and in job recruitment processes. In a double blind study, science faculty members were randomly assigned either a male or female name. Faculty participants rated the male applicant as significantly more competent and hireable than the (identical) female applicant. These participants also selected a higher starting salary and offered more career mentoring to the male applicant.

Table 1. Means for student competence, hireability, mentoring and salary conferral by student gender condition and faculty gender

	Male target student				Female target student				
	Male faculty		Female faculty		Male faculty		Female faculty		
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	*d*
Competence	4.01_a	(0.92)	4.1_a	(1.19)	3.33_b	(1.07)	3.32_b	(1.10)	0.71
Hireability	3.74_a	(1.24)	3.92_a	(1.27)	2.96_b	(1.13)	2.84_b	(0.84)	0.75
Mentoring	4.74_a	(1.11)	4.73_a	(1.31)	4.00_b	(1.21)	3.91_b	(0.91)	0.67
Salary	$30,520.83_a$	(5,764.86)	$29,333.33_a$	(4,952.15)	$27,111,11_b$	(6,948.58)	$25,000.00_b$	(7,965.56)	0.60

Scales for competence, hireability, and mentoring range from 1 to 7, with higher numbers reflecting a greater extent of each variable. The scale for salary conferral ranges from $15,000 to $50,000. Means with different subscripts within each row differ significantly ($P < 0.05$). Effect sizes (Cohen's *d*) represent target student gender differences (no faculty gender differences were significant, all $P > 0.14$). Positive effect sizes favor male students. Conventional small, medium, and large effect sizes for *d* are 0.20, 0.50, and 0.80, respectively (51). $n_{\text{male student condition}} = 63$, $n_{\text{female student condition}} = 64$. ***$P < 0.001$.



The top bars show the percentages of female candidates that were picked, and the middle bars show the percentages of times the lower-performing candidates in the pair was picked. The bottom bars show the percentage of times that the chosen candidate was male.

Measure	*M* (*SD*) Confrontation	*M* (*SD*) Nonconfrontation	*F* (1, 46)	*p* <	η_p^2
Teacher					
Comfort in class	05.05 (0.90)	04.29 (0.90)	8.66	.005	.16
Effectiveness	05.48 (0.78)	04.66 (0.93)	10.86	.002	.19
Knowledge	04.00 (0.80)	03.54 (0.61)	4.87	.032	.10
Likability	04.04 (0.68)	03.77 (0.77)	1.72	.197	.04
Offensiveness	01.10 (0.29)	01.17 (0.51)	.39	.538	.01
Prejudice	01.04 (0.14)	01.33 (0.49)	7.84	.008	.15
Female student					
Knowledge	3.83 (0.57)	3.71 (0.51)	.62	.435	.01
Likability	3.84 (0.67)	3.59 (0.73)	1.47	.232	.03
Offensiveness	1.24 (0.44)	1.54 (0.52)	4.83	.033	.10
Prejudice	1.36 (0.47)	1.78 (0.77)	5.42	.024	.11
Male student					
Knowledge	2.75 (0.59)	2.68 (0.75)	.11	.738	.00
Likability	2.68 (0.53)	2.75 (0.70)	.11	.736	.00
Offensiveness	4.04 (0.75)	3.35 (0.88)	8.81	.005	.16
Prejudice	3.58 (0.83)	3.61 (0.74)	.02	.900	.00
Level of bias					
Sexism	18.04 (3.35)	20.26 (3.32)	5.32	.026	.10

Method

In majority of the research papers, the conductors are implementing randomized ANOVA, ANCOVA, and t-test in analyzing the data of gender bias census. The response are income, attitude. In article *Science faculty's subtle gender biases favor male students.* the researcher compared four nested treatments, and use two-way ANOVA in analysing the data.

Relation of the Articles

The articles relate to each other because they all talk about gender bias in people's everyday lives.

In the article *How Stereotypes impair women's careers in Science* and *Science Faculty's Subtle Gender Bias Favor Male Students*, it shows gender bias against women in scientific researching fields and careers. Females in this case are viewed as less "qualified" even though they perform about the same or even higher than men.

In the article *Confronting Math Stereotypes in the classroom*, it talks about classroom gender bias in college. In this article, it talks about confrontation of sexism, whether teachers should be confronted when sexism occurs in the classroom. The purpose of the research was to examine the effects of confronting classroom sexism in terms of how female college students perceive the confronters and the confrontation effect on their sexist attitudes.

Sexism has various negative effects on women, and some of them are particularly relevant in educational settings. Despite the risks, there are important reasons to confront bias. As mentioned previously, some individuals do evaluate confronters positively. In fact, recent research conducted in the U.S. has focused on the perception of confronters as admirable. For example, one study showed that confronters of racial and sexual prejudice received higher ratings of likeability and morality than non confronters

Conclusion

Gender bias is observed in each of the studies. It is observed widely in the science education, research area, and science related careers..

For students, the preferred behavior towards sexism is confronting rather than neglecting.

Although female students may possess stronger competence, the hirability of male will likely be higher than women due to the gender bias.

Sources

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