

# Female Surgeons as Counter Stereotype: The Impact of Gender Perceptions on Trainee Evaluations of Physician Faculty

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**OBJECTIVE:** Similar to women in Science, Technology, Engineering and Mathematics disciplines, women in medicine are subject to negative stereotyping when they do not adhere to their sex-role expectations. These biases may vary by specialty, largely dependent on the gender's representation in that specialty. Thus, females in male-dominated surgical specialties are especially at risk of stereotype threat. Herein, we present the role of gender expectations using trainee evaluations of physician faculty at a single academic center, over a 5-year period (2010-2014).

**DESIGN:** Using Graduate Medical Education evaluation data of physician faculty from MedHub, we examined the differences in evaluation scores for male and female physicians within specialties that have traditionally had low female representation (e.g., surgical fields) compared to those with average or high female representation (e.g., pediatrics).

**SETTING:** Stanford Medicine residents and fellows' MedHub ratings of their physician faculty from 2010 to 2014.

**PARTICIPANTS:** A total of 3648 evaluations across 1066 physician faculty.

**RESULTS:** Overall, female physicians received lower median scores than their male counterparts across all specialties. When using regression analyses controlling for race, age, rank, and specialty-specific characteristics, the negative effect persists only for female physicians in specialties with low female representation.

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**CONCLUSIONS:** This finding suggests that female physicians in traditionally male-dominated specialties may face different criteria based on sex-role expectations when being evaluated by trainees. As trainee evaluations play an important role in career advancement decisions, dictate perceptions of quality within academic medical centers and affect overall job satisfaction, we propose that these differences in evaluations based merely on gender stereotypes could account, in part, for the narrowing pipeline of women promoted to higher ranks in academic medicine. (J Surg Ed ■■■■-■■■. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

**KEY WORDS:** gender stereotypes, female surgeons, graduate medical education (GME), trainee, faculty, bias

**COMPETENCIES:** Professionalism, Interpersonal Skills and Communication

## INTRODUCTION

The importance and validity of feedback provided by students regarding faculty and the quality of education they provide has been backed by an extensive body of literature.<sup>1-3</sup> Student evaluations are the cornerstone for tenure and promotional decisions at universities, directly affecting employment decisions.<sup>1,4</sup> Although some research supports that faculty gender plays a negligible role on evaluations,<sup>5-9</sup> these studies examine gender in isolation. However, gender bias is often subtle, occurring in interaction with other variables such as sex-role expectations.<sup>10-12</sup>

Faculty that do not match sex-role expectations (stereotypes), such as those in Science, Technology, Engineering

and Mathematics (STEM) disciplines are particularly vulnerable.<sup>10,13,14</sup> Recent research and commentary have successfully focused attention on gender disparities in STEM disciplines.<sup>13,14</sup> Unfortunately, though, gender disparities in the biological sciences, especially in medicine, have not been explored with such rigor. Medicine also presents a more complex environment, considering that postgraduates in medicine are apprentices (trainees), the traditional classroom environment is not the norm, the curriculum is fluid, female representation across various specialties is highly variable and in an academic medical institution, faculty often carry a dual role of physician and physician-scientist simultaneously. Hence, understanding the influence of gender on how trainees view and value female physicians, especially those in male-dominated specialties is crucial, providing a window into perceptions of female physicians as mentors and educators, which in turn directly and indirectly impacts the career path of these physicians.

The aim of this study was to report trainee evaluations for male and female physicians and how these may interact with certain gender expectations, with specific attention paid to specialties that have traditionally had low female representation.

## MATERIALS AND METHODS

This study was reviewed by the Stanford University Committee for the Protection of Human Subjects and was exempt from institutional research board review.

### Data Collection

Between July 2010 to June 2015, trainees (residents and fellows) enrolled in training programs at the Stanford University School of Medicine (SU-SOM) evaluated 2294 faculty with clinical duties at the Stanford University Hospitals (SUH) for a total of 7888 evaluations that were collated by the Office of Graduate Medical Education (GME) at SU-SOM. The evaluations were anonymous and processed through a graduate medical education management system (MedHub LLC, Michigan). All trainees provided feedback to the faculty using a quantitative or objective scoring system as well as qualitative comments. For the objective scoring system, MedHub arrived at an annual mean score by averaging the scores provided by all the trainees for the faculty in that academic year. Although the exact questions used to measure the faculty's ability as an educator varied between departments, all evaluations measured clinical competency, teaching at the bedside, didactics, and professionalism. This content did not vary systematically between different specialties. The final annual score provided was a single quantitative number on a scale of 1 to 10.

For the purposes of this study, only clinical faculty with a primary appointment at the SU-SOM were included (remaining  $n = 1413$  faculty). Faculty with secondary (adjunct) appointments at SU-SOM, including those primarily at the Veterans Affairs Hospital or an affiliated community hospital, were excluded to allow testing of our hypothesis in the same environment. Finally, solitary evaluations received by a faculty member in an entire academic year were removed to minimize the effect of individual biases on the entire group (remaining  $n = 1330$  faculty).

Published gender representation trends, available from the 2014 Association of American Medical Colleges (AAMC) Physician Specialty Data Book, were used to identify specialties that have high female representation nationally from those that do not.<sup>15</sup> Based on the AAMC data, in 2013, the average female representation across all specialties was 32.6%. We thus anchored the stratification for our study to this national average of 32.6%, classifying the 25 individual specialties and subspecialties where female representation nationally fell below the threshold of 32.6% as low female representation (LR); the remaining 16 specialties, with national representation exceeding the threshold, were considered to have average or high female representation (AHR) (Appendix A). For example, in the AAMC data, 60.4% of all active pediatricians were female (AHR), whereas only 4.6% of all active orthopedic surgeons were female (LR).

Finally, while AAMC publishes national trends on a large number of specialties, it is not comprehensive. For the purposes of this study, only faculty in specialties reported by AAMC were included, leaving a total of 1066 faculty with 3648 evaluations for analysis. Gender, race/ethnicity, rank for each academic year, appointment track and primary department were derived from the faculty roster made available by the Office of Academic Affairs at SU-SOM. Tracks included the clinical educator (CE) and the professoriate (physician scientist) track. Ranks included Clinical Instructor, Clinical Assistant Professor, Clinical Associate Professor, and Clinical Professor for the CE track and Assistant Professor, Associate Professor, and Professor for the professoriate track. Faculty demographics were then merged with their mean quantitative evaluation score (scale 1-10) for each academic year (2010-2011 to 2014-2015) along with the total number of evaluations received by the faculty member in that particular academic year.

### Statistical Analysis

All statistical analyses were conducted using Stata 13 (StataCorp, Texas). As distribution of the data was heavily left-skewed, analyses were based on the median. Non-parametric equality-of-medians tests were used to analyze differences by gender and clinical discipline type. We used

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