

# Gender Differences in Leadership Amongst First-Year Medical Students in the Small-Group Setting

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## Abstract

### Purpose

To investigate the extent of gender bias in the volunteerism of small-group leaders amongst first-year medical students, and whether bias could be eliminated with special instructions to the students.

### Method

The gender of leaders in small-group sessions in a real academic setting was monitored under two conditions: control conditions, in which basic instructions were provided to participants, and intervention conditions, in which the same basic instructions were provided plus a brief “pep talk” on the importance of experiencing a leadership

role in a safe environment. During the small-group sessions, an observer noted the gender and names of group leaders for later analysis. After a class debriefing, a subset of leaders and nonleaders from both the control and intervention groups were invited to be interviewed about their perceptions of the small-group experience. Interviews were tape recorded and transcribed for analysis.

### Results

In 2007–2008 and 2008–2009, disproportionately fewer women than men volunteered to become small-group leaders under control conditions. This gender bias was eliminated under

intervention conditions. The interviews illustrated how a subtle change in instructions helped some female students take on a leadership role.

### Conclusions

Gender bias in leadership in the small-group setting amongst medical students—even when women make up half of the class—may persist without targeted intervention. The authors suggest that frequent and consistent intervention during medical school could be an important factor in encouraging women to identify themselves as leaders, promoting confidence to consider leadership roles in medicine.

**P**revailing trends in undergraduate medical education emphasize integration of the clinical, basic, and social sciences.<sup>1</sup> Such reform is often accompanied by a decrease in curricular time devoted to didactic instruction and an increased emphasis on small-group activities, such as problem-based learning, in which students take on greater responsibility for self-instruction and collaborative peer learning. An important requisite of such small-group settings is that all students can express their ideas and practice

leadership roles in an equitable, safe, and nonintimidating environment. Therefore, all students—regardless of gender, race, nationality, and socioeconomic status—should feel empowered to provide leadership in small-group settings. But do they?

Since 1994, the lead author (N.L.W.) has taught in a setting in which small groups of first-year medical students choose a leader to guide a discussion on reproductive physiology for a larger group. In 2007, during one of these sessions, one of us (N.L.W.) became aware of the possibility of gender bias in leadership within this small-group setting. Specifically, a male student noted that none of the five small-group leaders in his session were women. Because women make up about half of each class at the David Geffen School of Medicine at the University of California, Los Angeles (UCLA), we expected that this equity in numbers would translate to equity in emergent leadership.

The purpose of this study was to investigate the extent of gender bias in these first-year small-group sessions at UCLA and to determine whether bias could be eliminated with special instructions to the students prior to

inviting them to volunteer as group leaders.

## Background

Gender bias in the selection of group leaders continues to be a widely reported phenomenon, even though women have reached professional parity with men in traditionally male-dominated fields,<sup>2–5</sup> including academic medicine.<sup>6–8</sup> In a meta-analysis of 49 journal articles and 26 dissertations or unpublished documents on the topic of gender bias in emergent leadership (median date of publication, 1980), Eagly and Karau<sup>2</sup> reported that significantly more men than women emerged as leaders in both laboratory and field studies, especially if the group tasks did not involve complex social interaction. Some have suggested that gender bias in leadership originates from gender-role stereotypes: Men are more competitive and aggressive, whereas women are more cooperative and work toward maximizing group harmony.<sup>9</sup> Further, the gender of the group leader seems to be related to the type of task or instruction the group has undertaken. Specifically, studies have shown that significantly more men than women were selected as leaders if group activities were

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task-oriented or associated with male stereotypes. On the other hand, there was little or no difference in the likelihood that either gender would be selected group leader if group activities were social-cooperative or associated with female stereotypes.<sup>2-5</sup> It has been noted that both men and women view men as being more capable leaders,<sup>10,11</sup> even though there is no empirical evidence for this being the case.<sup>12,13</sup> On the contrary, one study showed that women have the potential to be more effective leaders for organizational change, as they demonstrate a more “transformational” style of leadership than men do.<sup>13</sup> Nevertheless, as of 2007–2008, the gender gap in leadership continues—far fewer women than men hold leadership positions in academic medicine,<sup>14</sup> suggesting that gender-role stereotypes persist and have a deep-seated influence on the perception of effective leadership.

We investigated emergent leadership in a small-group setting as part of the broader instructional mission for first-year medical students. The format of the annual small-group sessions on reproductive physiology has been the same since 1994 at UCLA. Before the session, students receive five case-based questions related to information discussed during lecture or covered in required readings. Students are instructed to come to the small-group session prepared to discuss the questions. Each class of about 150 students is divided into six groups of roughly 25 students and preassigned to one of six 2-hour sessions at the beginning of the academic year. One of us (N.L.W.) is the sole instructor for these sessions and has no assistants, so discussion content is relatively uniform across sessions each year. On entering the classroom, students are seated at one of five tables; each table corresponds to one of the five questions. Therefore, there are approximately five students per table. After everyone is seated, the instructor informs each table which question they will discuss and provides the students with a set of instructions, including the process for selecting group leaders (discussed in detail below). This small-group session is required and, therefore, has been attended by over 99% of each class over the years. As noted above, a student alerted one of us to the possibility of gender bias in leadership, so we set out to investigate whether there was

significant gender bias in emergent leadership in these small-group sessions.

This study is unique for two reasons: It was integrated into a well-established, real-world medical classroom setting, and it aimed to eliminate the potential problem that disproportionately few female medical students were taking on leadership positions in the small-group setting. Because of the link between the perception of leadership ability and career advancement in academic medicine,<sup>6</sup> gender bias in leadership amongst medical students is an important issue for investigation and intervention.

## Method

We performed two studies, one in 2008 and another in 2009, to determine whether gender bias was occurring in the designation of small-group leaders and whether any existing gender bias could be modified or eliminated with special instructions. All procedures were reviewed and approved by the institutional review board of UCLA.

### Study 1 (2008)

During this initial observational study, 144 students attended six small-group sessions on reproductive physiology: 75 women (52%) and 69 men (48%). Each session had five tables of four or five students (30 groups in all), and each table represented one of five different case-based problems for discussion. As in the past, students freely selected a table. As in the past, N.L.W. provided the following instructions to all students:

You have 15 minutes to discuss the assigned problem amongst yourselves. Each group will need one volunteer to be group leader to guide discussion of their question. My role as instructor will be to correct misconceptions, answer questions, and provide additional information. The group leader will come to the front of the room, read the question, and then lead the discussion.

During the course of the small-group sessions, N.L.W. took notes on the gender of each group leader for later analysis.

### Study 2 (2009)

During this follow-up study period, 158 students attended six small-group sessions on reproductive physiology: 81

women (51%) and 77 men (49%). Each session had five tables of five or six students (30 groups in all). Unlike in previous years, N.L.W. quasi-randomly assigned students to tables (adjusted to balance gender). The 30 groups were equally divided between control and intervention groups. The control groups received the same instructions as did the groups in Study 1. The intervention groups received the same instructions plus an additional comment:

If you've never volunteered to be a group leader in other situations, this is a safe environment to try it out. It doesn't matter what your background is, what your major was as an undergraduate student, whether you're male or female—being a group leader is an important experience for everyone.

The purpose of the intervention instructions was to encourage a wider range of student leadership activity with the expectation that gender bias could be eliminated.

During the course of the small-group sessions, an independent observer took notes on the gender and names of the group leaders for later analysis. Four weeks after the sessions ended, we debriefed the students about the study. We provided the students with information, both verbally and in writing, about the purpose of the study, the verbatim instructions provided to the control and intervention groups, and contact information if they had any questions about the study. Shortly after the debriefing, we invited 20 leaders and nonleaders from control and intervention groups to be interviewed on their perceptions of the small-group experience. Ten students volunteered. Seven of these volunteers were women, and three were men.

We conducted semistructured interviews four weeks after the debriefing. During the interviews, we asked students what they remembered from the instructions, if anything. We then repeated the instructions verbatim and asked whether or not the instructions had made each student feel more or less inclined to be a group leader and how those instructions may have affected the process of choosing a group leader. Next, we asked whether the students' personal backgrounds had affected their decisions whether to volunteer to be group leader. Finally, we gauged students' perceptions of gender

differences in leadership in medical school. Interviews were tape recorded and later transcribed for analysis.

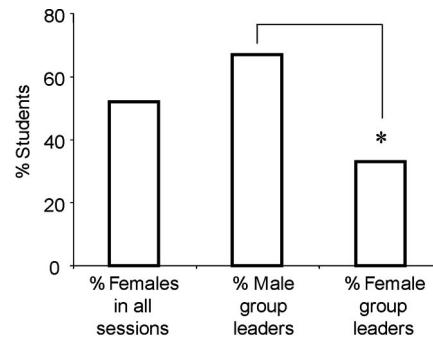
**Data analysis**

We analyzed differences between the numbers of male and female group leaders using a two-sided Fisher exact test. Values were considered significantly different if  $P < .05$ . Two of us (S.U. and M.V.) independently and systematically coded interview transcripts at the question level, and each abstracted themes from the data. Coding schemas and resulting themes were subsequently compared, and minor differences were resolved through consensus.<sup>15</sup> During the process of consensus, themes were further evaluated with respect to leadership position (leader or nonleader), experimental group (control or intervention), and gender.

**Results**

Figure 1 shows data from Study 1, in which all students were provided with control instructions. Groups at most tables were mixed-gender, with the exception of one all-female group and two all-male groups. Seventy-five (52%) of the participants were female, yet only 10 of 30 (33%) group leaders were female. On the other hand, 69 (48%) of the participants were male, but a disproportionately higher percentage of group leaders (20 of 30 leaders, or 67%) were male ( $P < .025$ ).

Figure 2 shows data from Study 2, in which half of the students were provided with the same control instructions as were groups in Study 1, and the other half were provided with additional intervention instructions aimed at eliminating gender bias in leadership. Eighty-one (51%) of the participants were female, and 77 (49%) were male. The control group had 43 females and 34 males, whereas the intervention group had 38 females and 43 males. As seen in Study 1, the control group had significantly fewer female group leaders than male group leaders (4 of 15 leaders, or 27%, were female; 11 of 15, or 73%, were male;  $P < .025$ ). On the other hand, the intervention group showed no significant difference between the number of female and male group leaders (7, or 47%, were female; 8, or 53%, were male). In the intervention group, the percentage of female group leaders



**Figure 1** Percentages of men and women who became group leaders under control conditions during Study 1 (2008). Asterisk indicates that significantly fewer group leaders were women compared with men ( $P < .025$ ).

reached parity with the percentage of women in the class.

Ten students volunteered to be interviewed in the qualitative portion of our study—seven females and three males. Five of these participants (one female leader, two female nonleaders, and two male leaders) were from control groups, and five (two female leaders, one male leader, and two female nonleaders) were from intervention groups. Our qualitative analysis of the interviews revealed that after the debriefing, six participants remembered the essence of the instructions given to them during the small-group session. Four participants from the control groups and two participants from the intervention groups correctly identified which group they were in, suggesting that the instructions were subtle and not overly leading.

Several of the interviews suggested that the process of choosing a group leader was not necessarily deliberative and sometimes done on a first-come-first-served basis (e.g., “I would have volunteered but John\* beat me to it”). Some groups chose a leader arbitrarily by playing a “nose game” in which one person silently placed a finger on his or her nose and others followed. The last person to do so became the group leader.

In one situation, a male student stated that he and a female student did most of the talking during the discussion, and as such both “illustrated a willingness” to become the leader. Ultimately, the decision came down to the male student’s attire:

I definitely did not volunteer initially ... but it just so happened that earlier that day, I had a shadowing interview for summer work ... so I was wearing a white coat, shirt, and tie. So the group, particularly Shirley, who was sitting to my right, thought that it was only appropriate that someone dressed as a physician [would become group leader].

Under typical circumstances, such as those in the control group, gender may well be the deciding factor when choosing between two individuals; more frequently, a male student will assume the responsibility. Our analyses indicated that the modified instructions for the intervention group broke that pattern. Specifically, students who recognized they tend to dominate in a small-group setting stepped back to give others a chance. As one female student noted,

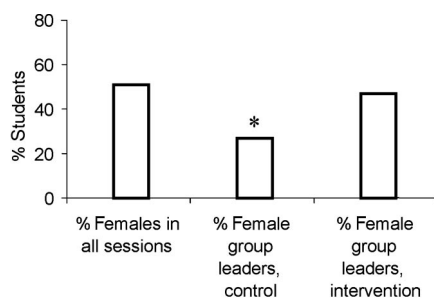
I guess there are more outspoken boys in our class; they are more aggressive. But after hearing the instructions, maybe some of them felt like they had to step off a little bit. I know at least in my group the males were not inclined to speak at all; I think that by the end it was between me and another girl who were going to speak.

Conversely, students who usually yield to others felt encouraged to take the lead, like this female student who had never been a group leader before:

While I don’t exactly remember your pep talk, just having you [the instructor] there definitely made me feel comfortable to do it.... I’m sure somewhere in that pep talk did give reassurance. Actually this is my first time I had ever volunteered throughout the year to do something in this role, to go up in front of the large group and speak.... I mean if anyone would have jumped out and said, “I want to do it” I wouldn’t have interfered with that. But no one really did, and I kind of thought, “you know, I’ll do it.” Well, I thought it was

\* We changed the names of the participants to protect confidentiality.





**Figure 2** Percentages of men and women who became group leaders under control and intervention conditions during Study 2 (2009). Asterisk indicates that significantly fewer group leaders were women compared with men in the control condition ( $P < .025$ ). There was no significant difference between the number of men and women who became group leaders in the intervention condition.

significant that, again, that was my first time doing something like that.

The observation that male students are more outspoken or competitive and tend to become group leaders was widely corroborated by our interviewees, including male students. In fact, one female student went as far as to say,

Just in my class in general, a lot of the girls are very sweet. Definitely brilliant and driven obviously, but they're very sweet and willing to accommodate.... Obviously it's stereotyped especially for women in medical school but in general the men that I've met in my class seem to have more of a competitive streak ... really strange competitive vibe that borders on arrogance for some of the males.

One male student attributed the disproportionate number of male group leaders to a perceived majority of men in his class (he guessed that 60% of his class were male), whereas in fact, the class is equally divided between males and females. A “male culture” may permeate throughout medical school, as illustrated by this comment from a female student:

I think more males stand up in class. There is still this, “a doctor is a man” that it's really specific to medical school because when I go to places in scrubs, they always ask me if I'm a nurse or if I'm in nursing school so I feel ... despite however far we've come ... there's still this, “a doctor is a man” when they are talking about a doctor or a researcher. Or told my cousin that I wanted to rearrange something in the block and my professor wouldn't let me, and she was like, why did HE do that? So there's this association with like, medical school and men.

## Discussion

Two years in a row, disproportionately fewer females than males became group

leaders in small-group sessions as part of the regular first-year medical curriculum. The data from students receiving control instructions in the two medical school classes were remarkably similar, suggesting a stable outcome, and showed that a disproportionately greater number of men compared with women volunteered to become group leaders. This gender difference in leadership was eliminated with brief additional instructions urging all students to participate and emphasizing the importance of experiencing group leadership in a safe environment. It is puzzling that under control conditions the small-group class environment was more threatening to women than to men, given that many aspects of the course should have been supportive of women. For instance, the small-group instructor (N.L.W.) is a woman and was very familiar to the students by the time the reproductive physiology small-group sessions occurred. The cochairs of the course, one of whom was N.L.W., were both women. And women's health was emphasized throughout the course, including during the small-group sessions. This suggests that women leading by example (e.g., strong female leadership in the medical school curriculum) are not sufficient to overcome ingrained, gender-based stereotypes regarding leadership.

The gender bias of group leadership that we observed under control conditions could be attributed to stereotype threat. Stereotype threat is a well-documented phenomenon referring to fear that an individual's performance will justify a negative stereotype of a group with which the individual identifies.<sup>16</sup> Studies have shown that this fear affects performance in a direction that “supports” the

stereotype. In our study, the stereotype would be that women do not make effective leaders<sup>10,11</sup>; therefore, women (and men) behaved in a way that undermines female leadership selection. Studies show that subtle differences in how a task is described to a subject group can have significant effects on performance.<sup>16–18</sup> An early example based on gender difference in math performance showed that how a math test is characterized had a significant effect on outcomes for female students but not for male students. Specifically, if the students were told that a test previously showed gender differences in outcome, women performed significantly worse than men; however, if another test was described as being previously gender neutral, there was no difference in performance between the same group of men and women.<sup>17</sup> Therefore, how a task is described can undermine performance based not on ability, but on stereotype threat. Importantly, the effects of stereotype threat on performance can be modified or reversed with simple instructions. Johns and colleagues<sup>19</sup> showed that briefly discussing the phenomenon and implications of stereotype threat with women before they took a test significantly improved their performance on a stressful math examination such that the gender difference in results was eliminated. In another example, exposing female subjects to TV commercials that aim to provoke the female stereotype inhibited women taking on leadership roles in an experimental situation. In that study, creating an “identity-safe environment” by instructing the participants that previous studies had shown no gender differences in leadership and problem-solving abilities eliminated the stereotype threat of the TV commercial.<sup>18</sup> In our study, we created an identity-safe environment in the intervention group, effectively eliminating the gender differences observed between the numbers of men and women who volunteered to become group leaders.

A concept related to stereotype threat is the observation that gender-role stereotypes can have a significant effect on the interactions between individuals in small groups, thus influencing who becomes the small-group leader. Group members who initiate the most verbal interaction are often considered to be taking a leadership position.<sup>20</sup> A study

investigating interaction patterns and discussion in small groups of students found that males initiated more interactive discussion than did females in the mixed-sex setting.<sup>20</sup> Indeed, our interviewees noted that male students tend to be more outspoken and are more likely to become group leader. When comparing same-sex and mixed-sex groups, Aries<sup>20</sup> found that the presence of men in mixed-sex groups caused women to speak less compared with women in all-female groups. In mixed-sex groups, women initiated only 34% of the total interactions and spoke less than men did of traditional “male” issues regarding achievement, power, and societal institutions. Aries<sup>20</sup> noted, “The small group became a microcosm of the larger society in which it is considered appropriate for men to dominate women but not the reverse, and sex-role pressures led men to assume leadership in mixed groups.” Of course, this study was performed over 30 years ago, and there have been major advances in the numbers of women entering male-dominated fields, including medicine, between then and now. Even so, the number of women leaders in academic medicine has been slow to advance relative to the proportion of women medical students and women residents over this same period of time. When it comes to leadership, sex-role stereotypes (subtle or overt) apparently continue to affect outcomes.<sup>6–8</sup>

As far as we know, this is the first published study documenting gender bias in emergent leadership amongst medical students—and it also provides an effective, yet simple, approach to eliminate this bias in the small-group setting. But does gender bias in leadership extend beyond medical students in the area of academic medicine? There is evidence of a gender bias limiting women’s career advancement in academic medicine, and there also is evidence that this limitation becomes increasingly progressive as one moves up the academic ladder into leadership positions. For example, the 2007–2008 Association of American Medical Colleges’ *Women in U.S. Academic Medicine Statistics and Benchmarking Report*<sup>14</sup> showed that although the representation of women medical students and medical school faculty has increased between 2002–2003 and 2007–2008, this representation drops

off with each step up the academic ladder. In 2007–2008, women represented 49% of enrolled medical students and 45% of residents and fellows. These figures increased in just five years from 2002–2003, when women represented 47% of enrolled medical students and 38% of residents and fellows. Similarly, there was a 4% increase across five years in the percentage of women medical faculty; in 2007–2008, women represented 40% of assistant professors, 29% of associate professors, and 17% of full professors. The drop-off in female representation continues for leadership positions in academic medicine, with only 12% of departmental chairs and 10% of medical school deans being women.

Further, Carnes and Bland<sup>7</sup> noted that leadership in academic medicine and the biomedical sciences is often tied to the prestige and power that come from receiving large grants from the National Institutes of Health (NIH), allowing principal investigators (PIs) to build influential and successful research programs. In 2005, the NIH announced a new prestigious award as part of the NIH Roadmap for Medical Research—the Clinical and Translational Science Awards (CTSA). Each of these is headed by a single PI and has an annual budget of up to \$14 million of direct costs. On the basis of literature that women are viewed as inferior leaders in academic medicine and biomedical sciences, Carnes and Bland<sup>7</sup> predicted that most awardees would be male. This prediction was borne out. In 2007, 12 CTSA sites had been awarded by the NIH, and all 12 had male PIs. Of the 35 applications received, none had a female PI.<sup>7</sup> As of June 2009, there were a total of 39 CTSA sites, with 33 male PIs (85%) and only 6 female PIs (15%). According to a recent study by Carnes and colleagues,<sup>8</sup> further evidence of gender bias in leadership positions within academic medicine is demonstrated by the number of women chairs in departments of internal medicine in the top 25 academic medical centers (ranked by NIH funding): zero. They noted, “Because internal medicine contains the largest number of women physicians and because service as a chair prior to becoming dean is almost a universal prerequisite, flow in the leadership pipeline is starkly uneven by gender.” In the heavily male-dominated specialty of surgery, female surgical

leaders reported significant barriers to advancement and success.<sup>21</sup> Eighty percent of female surgical leaders (chairs of department, center or program directors, or surgeons-in-chief) reported “overt discrimination, gender prejudice and sexual harassment,” and 40% felt that these problems limited their job opportunities.

Another important aspect of leadership in academic medicine involves peer-reviewed publications. Dickersin and colleagues<sup>22</sup> investigated the gender of editors, reviewers, and authors of four epidemiological journals (*American Journal of Epidemiology*, *Journal of Clinical Epidemiology*, *Annals of Epidemiology*, and *Epidemiology*) from 1982, 1987, 1992, and 1994. In this study, the term “editors” referred to editors-in-chief, associate editors, and editorial consultants. Data in which the sex was identified showed that men made up 87% of the editors, 73% of the reviewers, and 71% of the authors.<sup>22</sup> As of June 2009, men still dominated the leadership in these same four journals. All four editors-in-chief were male, and 21 of the 29 (72%) associate editors and/or members of the editorial boards were male. Because editors, review board members, and reviewers have complete control over what gets published, and because publications, grant awards, and career advancement are inextricably linked, these leaders in academic publications are highly influential in career outcomes. Whether or not reviewers and editors of biomedical journals exhibit gender-based bias when choosing papers for publication is a matter for speculation. Notably, recent work by Budden and colleagues<sup>23</sup> suggests that gender bias in publications does exist. The study found a significant increase in papers with a female lead author in the journal *Behavioral Ecology* following introduction of a double-blind review system in which the identities of the reviewers and the authors are not revealed to each other. When compared over the same time period against a similar journal with a single-blind review system in which the reviewers knew the identities of the authors, this increase was not seen. Importantly, the increased representation of female authors following initiation of double-blind review more accurately reflected the composition of women in the academic life sciences.<sup>23</sup>

Our study has several limitations. First, the external validity may be limited by the fact that this study was performed at one institution; our findings may not translate to other institutions with different student bodies and admission policies. Also, we involved only first-year students; more senior students might have behaved differently. Further, relatively few students volunteered to be interviewed, so our qualitative data were limited. Nonetheless, the interviewees provided a rare glance of what transpired in some of the small-group discussions and how a subtle change in instructions may affect gender roles in leadership.

### Conclusions

Women have made tremendous progress in gaining admission to medical school in recent decades. In 1985, women represented 34% of the first-year medical school class in the United States<sup>6</sup>; their representation grew to 49% of the class in 2007–2008.<sup>14</sup> However, this progress at the bottom rung in academic medicine has not translated to comparable progress in numbers of female tenured faculty, full professors, departmental chairs, and deans. Our study demonstrates that gender bias in leadership in the small-group setting amongst medical students—even when women make up half of the class—will persist without targeted intervention. We suggest that frequent and consistent intervention during medical school could be an important factor in alleviating gender bias that plays a role in limiting women's career advancement in academic medicine, as well as other career paths in medicine.

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