FACULTY FORUM

Superiority of Women in Statistics Achievement

Charles I. Brooks
King's College

Contrary to Buck's (1985) recent report, in my introductory statistics course, female students make higher grades than male students. This article compares my experience with Buck's and mentions some of my anecdotal observations concerning the women's superior performance.

As Buck (1985) recently suggested, most studies indicate that, compared to men, women express greater mathematics anxiety and perform less well in mathematics and mathematics-related courses. Comparing letter grade frequencies for men and women in her statistics classes, she found "no significant difference in the distribution of ABCDF grades by gender" and suggested several possible explanations for her results (p. 100). Among such possibilities are that she might have given the women more individual attention, served as a positive role model for the women, or conveyed an expectation that women should perform as well as men.

Buck seems to believe that, compared to the men, her female students began their statistics course at a disadvantage in mathematical skills and that having a female teacher compensated for the disadvantage. Such an assumption may be tenuous. As Minton and Schneider (1985) pointed out, men may have superior skills for mathematical reasoning and for solving complex mathematical problems but not for computation, which requires accuracy and speed. They also noted that women may express more anxiety about math, but available evidence does not lead to a confident prediction that women will show poorer achievement than men in math courses.

I have taught an introductory statistics course once a year for the past 10 years; Buck's article sent me to my grade book. A total of 154 men and 168 women have taken the course during the past decade. On a scale for which A = 4.00, the average grades for men and women were 2.21 and 2.74, respectively. This superiority of women is statistically significant, $t(320) = 5.30$, $p < .001$. Like Buck, I also performed a chi-square analysis on letter grade frequency by gender of students. Consistent with the *t*-test analysis, the frequencies varied as a function of gender, $\chi^2(4, N = 322) = 23.81$, $p < .001$. For male students, the percentages were: A (11%), B (24%), C (48%), D (10%), and F (7%); for female students, the percentages were: A (23%), B (33%), C (39%), D (4%), and F (1%). More than half of my female students received an A or B, but only one third of my male students did.

Because I am a male teacher, Buck's second hypothesis is not pertinent to my results. It is possible that I gave female students more attention (Buck's first hypothesis), although the only time I work individually with students is when they come to see me during office hours. As for Buck's third hypothesis, I am not aware of any behavior on my part that would convey special expectations for my female students.

I can offer the anecdotal observations that, compared to men, women are more likely to show up for extra review sessions, are less often absent from class, are more likely to profess "ignorance," and are more likely to seek help during office hours. This last observation is consistent with data reported by Kleinke and Kahn (1980). In addition, my female students are more likely to sit in the front of the room. I have also found similar patterns in my general psychology classes: women tend to sit in the front of the room, to cut class less often, and to get higher grades.

I can only conclude that female students in my statistics classes show stronger achievement motivation and perform better than my male students. And, unlike Buck's students, the women in my classes obtain higher grades. This last finding is not all that surprising. Other investigators have found that, compared to men, women earn higher grades (Grams & Waetjen, 1975) and have more positive attitudes about school (Leuptow, 1975).

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Note

Requests for reprints should be sent to Charles I. Brooks, Department of Psychology, King's College, Wilkes-Barre, PA 18711.

More on Superiority of Women in Statistics Achievement: A Reply to Brooks

Jane L. Buck
Delaware State College

This article explores possible reasons for the differences between my results (Buck, 1985) and those of Brooks (this issue) concern-

ing gender differences in statistics achievement. Additional analysis of my data revealed no significant gender differences. There is a need for better controlled studies to test some of the hypotheses that our exchange has generated.

Brooks (this issue) reports results at variance with mine (Buck, 1985) concerning the performance of men and women in statistics courses. Although I found no significant difference in the distribution of grades by gender, Brooks found that female students were superior to male students. Accordingly, I went back to my grade book and performed separate *t* tests for my elementary and advanced classes, and computed the percentages of men and women obtaining each letter grade. For my elementary students, $t(311)$ was a nonsignificant 0.22, and for my advanced students, $t(150)$ was a nonsignificant 0.50. In elementary statistics, the percentages for men were A (31%), B (30%), C (19%), D (12%), and F (8%); for women they were A (31%), B (24%), C (27%), D (11%), and F (7%). In advanced statistics, the percentages for men were A (35%), B (26%), C (29%), D (10%), and F (0%); for women they were A (46%), B (20%), C (18%), D (14%), and F (1%). It is clear from these results that there were no significant gender differences in statistics performance in this population.

Brooks asserts that, despite women's higher level of expressed anxiety about mathematics, no available evidence leads to the prediction that they will show lower achievement than men. Fox, Tobin, and Brody (1979), however, reporting in a review of the literature, stated that sex-related differences in mathematics achievement favor males.

Brooks dismisses my first hypothesis regarding my results, which suggests that I might spend more time with female students, and my third hypothesis, which suggests that I might convey equal expectations for all my students, as possible explanations for his female students' superior performance. He states that he works with students individually only when they come to his office and that he is unaware of any behavior that would convey higher expectations for his female students. The literature on teacher expectations and self-fulfilling prophecy would suggest that unconscious classroom behavior on the part of an instructor with differential expectations is sufficient to mediate such expectations (Rosenthal, no date). Rosenthal's data indicate that positive expectations operate to improve the performance of students who are particularly adept at reading nonverbal cues, such as tone of voice, facial expressions, and body movements. He and his colleagues have found women to be superior to men in their ability to read such cues, particularly when delivered by men. If Brooks has higher expectations for his female students than for his male students, it is possible that those expectations are being mediated unconsciously in a variety of nonverbal channels. Rosenthal identifies four overlapping ways in which teachers behave differently toward those for whom they entertain high expectations: (a) a warmer general climate, (b) differential warmth involving praise and feedback for good performance, (c) a tendency to teach more, and (d) a tendency to ask more and tougher questions and to encourage students to respond by waiting longer before moving on to the next student.

Brooks's anecdotal observations regarding the superior attendance record and querying behavior of female students is congruent with my experience. In my case, however, such behavior was not sufficient to allow women to outperform their male colleagues. Because many of my students are Black, it is possible that an interaction between race and gender could account for our different results.

Another possible explanation for findings that run counter to those reported by Fox et al. (1979) is that statistics, although it uses some elementary mathematical concepts, has more in common with verbal than with mathematical reasoning. All of this is, of course, merely speculative. It would be informative to perform controlled experiments to test the various hypotheses generated by this discussion.

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Note

Requests for reprints should be sent to Jane L. Buck, Department of Psychology, Delaware State College, Dover, DE 19901.

Who Cares About Good Teaching?

James H. Korn
Saint Louis University

The number of awards for distinguished teaching in psychology and the numbers of nominations for those awards are compared to those for other awards. The data indicate relatively weak support for teaching awards programs. Suggestions are made for ways to increase that support.

It seems that teaching is a relatively unimportant activity for psychologists. One might reach this conclusion after reading the list of distinguished awards presented at the annual convention of the American Psychological Association (APA). In 1985, ten people received awards for scientific contributions and seven people for professional contributions. Only two psychologists received teaching awards (APA/APF Award Winners Named, 1985).

This pattern is similar to that of previous years. Examination of the archival (June) issues of the *American Psychologist* each year from 1981 through 1985 shows that annually there are 7 to 10 scientific awards, 4 to 7 professional awards (including public interest awards), 3 to 7 awards presented to media, and 1 or 2 teaching awards.