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The Effect of Instructor Gender and Student Gender on Course Evaluations

An Interactive Qualifying Project

Submitted to the Faculty of

Worcester Polytechnic Institute

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Degree of Bachelor of Science

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Abstract:

In this project, we analyzed the effect of instructor gender and student gender on students' evaluations of the professors at Worcester Polytechnic Institute. We used the Statistical Analysis System (SAS) to analyze the data from the first fourteen questions of the WPI evaluation forms which we collected during Term C99 at WPI. Four hundred forms from eleven courses were analyzed. The results seemed to show that female professors received lower ratings than male professors and female professors receive their highest ratings from female students and their lowest ratings from male students. However, we could not draw a definite conclusion because the sample size was too small.

Acknowledgement:

We would like to give special thank to Professor Judith E. Miller and Professor Carolina Ruiz, our advisors, who helped us very much to complete this project. We would also like to thank Professor Joseph Petrucelli from the Mathematical Science Department at Worcester Polytechnic Institute for helping us on generating and interpreting the statistical data. Furthermore, we would like to thank all eleven professors who participated on this study and all those students who took their time to respond to our surveys and gave us valuable data.

I Introduction

As students, we never had the right to evaluate our professors at the end of each semester when we were in school in Vietnam. We treated our professors as our parents. We could not complain about them no matter what they had done to us. It is a part of our culture. So students never evaluate professors in our country.

When we first attended college in the United States we thought it was the same as colleges in Vietnam. However, it was totally different. Also, there was a strange thing that we had never done before: at the end of each semester, we had the liberty to evaluate our professors about their performance, teaching style, course organization, etc. We thought about the benefits of doing this and during the 1998-1999 academic year we had a chance to do an Interactive Qualifying Project about evaluating professors.

Also, we saw the difference in relationship between professors and students. American students treat professors as their friends without concern about their ages, degrees, contributions, etc. Especially, there are two things we have noticed about other students. First, most male students tend to be closer to male professors and so are female students to female professors. Secondly, male professors are more welcomed by the students than female professors. When we were back in our country, Vietnam, we treated our teachers equally regardless of their gender. And the most important thing was no matter who they were and where they came from, we as students always appreciated their performance and teaching style. Therefore, we wanted to find out why the relationship between professors and students in the United States is different. This IQP is about the effects of instructor gender and student gender on the students' evaluation of college professors at Worcester Polytechnic Institute.

As a result of our IQP, we hope students would fill in the numerical parts and the written segments of the form seriously, fairly, thoughtfully, and thoroughly. Most of students do not know that the summary sheets for previous course evaluation data can be accessed in the library, from the WPI web page, and even from their own UNIX accounts by typing "evaluation" at the prompt. With students making a sober effort to fill out the form thoughtfully, faculty would read them more seriously and make appropriate changes in their teaching. Thus, the process of criticizing the course and making changes in teaching style will improve.

I.1 Project Objective

The purpose of this project is to determine the effects of instructor gender and student gender on student evaluations of the professors at Worcester Polytechnic Institute. We performed statistical tests to find out if the following hypotheses hold true at WPI.

I.2 Research Hypotheses:

1. Female professors receive their highest ratings from female students and their lowest ratings from male students.
2. Female professors receive lower ratings than male professors do.

II Literature Review and Background

II.1 Factors Affecting Student Ratings

After brainstorming the topic we found that there are a lot of factors that might affect the evaluation of professors by students. These include class size, student's class year, the gender of the students doing the evaluation, the gender of the professor being evaluated, major, ethnicity of professors, the teaching experience of the individual being evaluated, subjects, age, professor's teaching years, rank, personalities, culture, and pregnancy. However, we concentrated on the effects of instructor gender and student gender and we limited our analysis to Worcester Polytechnic Institute.

II.2 What does gender mean?

"Gender means a continuous and persistent sense of our selves as male or female. It is something everyone has, but rarely thinks about. We know we are either men or women and simply take it for granted. We behave in masculine or feminine ways that have become habitual to us through our lives, so that we give our behavior no thought, we think of it as being natural to us. Yet whenever we meet someone, the first thing we note is whether that person is a man or a woman. It predicts the way the interaction between us will proceed. And if the behavior of the other person gives cause for doubt, it causes worry and a feeling of insecurity" (Gendys Network).

II.3 What are differences in gender?

"Men are different from women. That would seem to be self-evident. They are different in aptitude, skill and behavior, but then, so is every individual person. It seems reasonable to suggest that the sexes are different because their brains are different, but then no two human brains are the same". Gendys Network suggested that our culture is in trouble

because many women have been brought up to believe that they should be the same as a man. Well, we definitely agree that our culture is in trouble because socially our culture still expect women to behave like women and men to behave like men (Gendys Network).

II.4 Gender Effect on Student Ratings

"In most of the studies reviewed, gender typically has been examined only in terms of main effects, that is, only in terms of whether male and female professors receive different mean ratings. A complex picture emerges when students' evaluations are examined as a function not only of professor gender but also of student gender and gender-typed characteristics of the professors. For example, male students sometimes have been found to rate female faculty lower than they rate male faculty"(Basow, 1995).

Within the last four years, we have taken science classes at five different colleges, some of which were liberal arts schools and some of which were technical schools. However, we found from our readings that male professors were rated higher than female professors at both liberal arts and technical schools. As we read some articles on this topic, we saw they reported different results. Some studies found that the average rating of all male instructors does not differ significantly from the average of all female instructors at most colleges. Elmore and LaPointe (1974, 1975) found no significant difference in the rating of female and male professors, whereas Kaschak (1978) and Lombordo and Tocci (1979) found that female professors received lower ratings than did male professors. Basow (1995) found that "Overall, the ratings of male professors appeared to be unaffected by student gender. In contrast, female professors tended to receive their higher ratings from female students and their lowest ratings from male students. The mean ratings received by female and male professors also varied as a function of the divisional affiliation of the course."

II.5 What could lead to the instances in which female instructors get lower ratings?

One possibility is that on an individual-by-individual basis, the numbers simply reflect a hard reality that students are less satisfied with the female instructors and/or the course as a function of the instructor's direct performance, organization, presentation skills, approachability, testing/feedback, etc. Another possibility has to do with contextual factors such as class size, required/elective status, content considerations, course level, experience, or disciplinary affect. We enrolled at other colleges for three years before entering to WPI. We saw three female professors who had been teaching for almost six years at the institution but they taught only the introductory classes. Right before we entered WPI, those three female professors got tenure and they still taught the lower level courses during the last academic year, 1998-1999. So, female professors' average ratings may have been lower than the ratings of male professors teaching upper level, elective courses and seminars because they were disproportionately assigned to lower level, required, large enrollment courses, in which student motivation is likely to be lower. "*Men are overrepresented in the higher ranks (whereas men are 70% of all college professors, they are 86% of all full professors), in science, and in technical fields as compared with the humanities. Women also are overrepresented in introductory courses. (Basow, 1995)*".

III Methods

III.1 Procedures

a) Hypothesis I

A slightly modified version of the WPI evaluation form was generated. Some written segment questions were cut and a question about student gender was added. The first fourteen questions, which included numerical ratings of the professor were focussed, students had to choose a numerical value as described: 0= Not Applicable (NA), 1= strongly disagree (SD), 2= disagree (D), 3= agree (A), and 4= strongly agree (SA). The WPI evaluation form can be found in Appendix I (front side) and Appendix II (backside) and the modified evaluation form can be found in Appendix III.

A letter (Appendix IV) was sent via email to all of the professors at Worcester Polytechnic Institute to ask for their participation in this study. The standard WPI course evaluation form with gender identification on it was distributed in those classes that participated in the study. The only data that needed for this study was found on the front side. The individual course evaluation results would be held in complete confidence. By participating in this project, the professors would get the mid-term comments from the students that were in their classes. With this feedback from the students, the professors would have a chance to improve their performance and teaching style before the final course evaluations occurred.

Eleven professors, eight females and three males, agreed to participate in this project. Survey administration began in February of 1999. The modified evaluation forms were then distributed in the eleven volunteers' classes. The standard procedure for administering course evaluation forms was as follows: the evaluation was done at the beginning and in

some classes at the end of the class period but not on the same day as an exam. Most of the professors allowed their students ten to fifteen minutes to complete the evaluations. This time should have been sufficient for students to complete the form in a thoughtful manner. The instructor wrote the course number, section number, and instructor's name on the board, and then left the room while the students was completed their evaluations. The student names did not appear anywhere on the form but their gender was requested. The completed evaluation forms were then collected.

After the forms were received, a copy of the front page of each form was made for analysis. The bottom of the original form was then removed, so that the students' gender would not be revealed to the professor (see Appendix V). Finally, the original forms, which included comments on the reverse side, were given back to the professors.

For each course, the following procedure was followed. The number of responses for the four columns: SD, D, A, and SA of male students and of female students were hand counted. The number of responses for each of those four columns and the total number of all responses was considered as the first sample size when it was in the statistical program. All of this data was needed to test the first hypothesis that "Female professors receive their highest ratings from female students and their lowest ratings from male students." Each course was treated separately in the statistical analysis.

b) Hypothesis II

The evaluation form results of those same eleven courses for all offerings in the last five years, from Term A94 to Term E98, were obtained to test the second hypothesis that "Female professors receive lower ratings than male professors." The data were obtained from WPI evaluation web site (http://www.wpi.edu/Academics/Eval) and were saved as the

Plain Text. The Plain Text file was then opened in Excel. The Fixed Width for the Original Data Type was then chosen and the "Next" button was clicked. The Data Preview screen was scrolled down until the following six columns were seen: NA, SD, D, A, SA, and Part I. A break line was created right after each of the first six columns by clicking the desired position on the top of the screen. Pressing the "Finish" button, which led to the Excel screen, completed it. The Excel summation function was then used to get the number of responses for each the following four columns: SD, D, A, and SA. The same method was used for all of the other courses.

Professor Joseph Petruccelli assisted in analyzing the data for the statistical analysis. Professor Petruccelli showed us how to use the statistical program SAS, which statistical test was the best for the analysis, and how to analyze the data. The Bootstrapping test was chosen because this test samples from the same data set hundreds or thousands of times in order to increase statistical significance. The data then was substituted in the Bootstrapping test found in the Statistics program SAS. By using SAS, the researched hypotheses were tested to see if these predictions were true at WPI. The statistical data was then gathered for discussion section.

III.2 Statistical Concepts

The following is the statistical test used in the Result and Discussion Section

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS

ENTER THE FIRST SAMPLE SIZE n1 — is total of SD+D+A+SA of first sample
ENTER THE FIRST SUCCESS NUMBER x1 — is number of SA of first sample

ENTER THE SECOND SAMPLE SIZE n2 — is total of SD+D+A+SA of second sample
ENTER THE SECOND SUCCESS NUMBER x2 — is number of SA of second sample

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP		
NORMAL THEORY		

III.3 How we took our data information and converted it to the above format

The Bootstrap test first asked: "Do You Want To Work On One or Two Populations", two was entered. The two populations were the first sample and the second sample. In testing the first hypothesis, the first sample might be all responses from female students in one course and the second sample might be all male students in the same course. In testing the second hypothesis, the first sample might be results from all female professors and the second sample might be results from all male professors. Second, "Enter The First Sample Size n1", the total number of responses of the following four columns: SD + D +A + SA, was then entered. Third, "Enter the First Success Number x1", the total number of responses of the SA column of the first sample was entered. Fourth, "Enter The Second Sample Size n2", we entered the number we got from the total of these four columns: SD + D +A + SA. Fifth, "Enter the Second Success Number x2", we entered the total number of the SA column of the second sample. Sixth, "Enter The Name Of The Data Set For Bootstrapped Parameter Estimates", we typed in the course name and number, or professor gender, etc. Seventh, "Enter the Number of Bootstrap Iterations", we entered the default number: 2000. Finally, "Enter Confidence Level (Between 0 & 1), we entered the default number: 0.95. Then, the bootstrap test gave us "The 95% Confidence Interval For P1 - P2", which we only concentrated on the lower and upper limit on the Bootstrap row and we disregard using the

Normal Theory for the analysis. The 95% Confidence Interval For P1 - P2 represents the range of probabilities of statistical significance in the 2000 iterations of the test.

We found the statistical significant results by subtracting the lower limit from the upper limit. If both limits do not have the same sign convention, the difference between the means of the two samples is statistically insignificant. We recommend you to see all the Appendices on the back of this report for further understanding how we converted data to the above format.

IV. Results and Discussion:

IV.1 Do the researched hypotheses stand true at WPI?

Hypothesis I: Female professors receive their highest ratings from female students and their lowest ratings from male students.

There were eight female and three male professors in our study. For a significant result, we are concentrating on the SA (Strongly Agree) column only, because SA is a stronger indication of approval than A (Agree). Furthermore, more than 50% of courses got 90% or better SA+A ratings, indicating that A ratings were not strong positive. For confidentiality, we do not list the names of professors who participated in our project. We created the 'Course #' to represent each course for our analysis and report. The 'Course #' is only recognized by us, our advisors, and participating professors who want to know their own analysis result.

There were eight female professors in our project and they taught eight different courses. From these eight courses, we had two hundred seven students: forty-eight were female and one hundred fifty-nine were male. After we converted the data to the statistical summary, we found that only three courses gave significant different results and the other eight courses were not. The eight courses were then listed on Appendices: IX-XVI. The three courses that give significant difference are analyzed further here.

Course 1 During Term C 1999

First Sample is: Female Students

Second Sample is: Male Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 84

ENTER THE FIRST SUCCESS NUMBER x1 1
ENTER THE SECOND SAMPLE SIZE n2 478
ENTER THE SECOND SUCCESS NUMBER x2 36

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 1

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.0941047	-0.0270628
NORMAL THEORY	-0.0965394	-0.0302787

We have six female and thirty-nine male students enrolled in the above science course. From the statistical analysis we found female students rated the female professor higher than male students. However, we could not draw a conclusion because one out of five female students rated this female professor with SA but we have thirty-six out of thirty-nine male students rated this female professor with SA.

Course 2 During Term C 1999

First Sample is: Female Students

Second Sample is: Male Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 172
ENTER THE FIRST SUCCESS NUMBER x1 77
ENTER THE SECOND SAMPLE SIZE n2 235
ENTER THE SECOND SUCCESS NUMBER x2 46

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 2

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000

ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.15663038	0.34482098
NORMAL THEORY	0.1619531	0.34190637

We have thirteen female and seventeen male students enrolled in the above course. This is still a science course but the number of female and male students was not very different. From the statistical analysis we found female students were rated female professor much higher than male students. The difference was very significant.

Course 3 During Term C 1999

First Sample is: Male Students

Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 168
ENTER THE FIRST SUCCESS NUMBER x1 54
ENTER THE SECOND SAMPLE SIZE n2 132
ENTER THE SECOND SUCCESS NUMBER x2 29

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 3

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) .95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.00001407	0.19966234
NORMAL THEORY	0.00185031	0.20161289

We have eight female and twelve male students enrolled in the above course. However, this is a humanities course and the number of students between female and male were not very different. From the statistical analysis we found male students rated the female professor much higher than female students. The statistical result is very significant. This result tells us that this female professor received her highest ratings from male students and their lowest ratings from female students.

We have different results from sciences and humanities. We cannot say female students rated female professors who taught science classes higher than male students; or that male students rated female professors, who taught humanities class, higher than female students. The other eight courses were both sciences and humanities and taught by both female and male professors. However, they were not significant according to our statistical analysis. As we stated in the statistical concepts section, the statistical significant results by taking the lower limit subtracts from the upper limit and both limits should have the same sign convention otherwise the difference is not significant.

Since those results did not clearly support or refute our hypothesis, we combined the results of all eleven courses by professors gender and students gender and analyzed in the following section.

Male Professors For All Three Courses During Term C 1999

First Sample is: Male Students

Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 1856

ENTER THE FIRST SUCCESS NUMBER x1 741
ENTER THE SECOND SAMPLE SIZE n2 478
ENTER THE SECOND SUCCESS NUMBER x2 178

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES MALE PROFESSORS

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	- 0.0210956	0.07509299
NORMAL THEORY	- 0.0218699	0.07559143

According to our statistical analysis, these three male professors received insignificantly different rating from male and female students.

Female Professors For All Eight Courses During Term C 1999

First Sample is: Female Students

Second Sample is: Male Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 734
ENTER THE FIRST SUCCESS NUMBER x1 174
ENTER THE SECOND SAMPLE SIZE n2 2074
ENTER THE SECOND SUCCESS NUMBER x2 380

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES FEMALE PROFESSORS

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.01766286	0.08735064

NORMAL THEORY	0.01885444	0.08881834

This is the combination of all eight courses. From the statistical analysis we found female students rated the female professor much higher than male students. The statistical result is very significant. This result tells us that in the aggregate the female professors in our study received their highest ratings from female students and their lowest ratings from male students.

More than three hundred fifty different courses were taught at WPI in Term C99. Only three out of eleven courses we surveyed gave significant differences between male and female student ratings, but in opposite directions. Therefore, the results do not support the hypothesis. This suggests a survey with more courses. Unfortunately, there were only eleven professors who participated in the project. We think our project should be continued with more courses in the future. The results were significant when we combined all eleven courses by professors gender and students gender, but the overall results do not clearly support our hypothesis because we had limited experimental data.

Hypothesis II: Female professors receive lower ratings than male professors do.

We obtained the evaluation results for all of the offering of the each of eleven courses for the past five years. However, we did not do the statistical analyses for three courses because courses 5 and 10 were taught only by male professors and course 4 was taught only by female professor. The procedures for these steps were stated in the Method section.

There were three courses that gave significant results but not the same three courses as the first hypothesis. They are explained below:

Professor Gender For Course 7 Within The Past Five Years

First Sample is: Male Professors

Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 794
ENTER THE FIRST SUCCESS NUMBER x1 241
ENTER THE SECOND SAMPLE SIZE n2 649
ENTER THE SECOND SUCCESS NUMBER x2 27

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_7_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.22581869	0.29592233
NORMAL THEORY	0.22644484	0.29740313

This is a science course. Male professors rated higher than female professors and this result is significant.

Professor Gender For Course 8 Within The Past Five Years

First Sample is: Male Professors

Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 335
ENTER THE FIRST SUCCESS NUMBER x1 150
ENTER THE SECOND SAMPLE SIZE n2 945
ENTER THE SECOND SUCCESS NUMBER x2 179

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_8_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.24075084	0.41301908
NORMAL THEORY	0.19952477	0.31716164

This is an engineering course. From the statistical analysis, male professors were rated higher than female professors and once again, the result is significant.

Professor Gender For Course 11 Within The Past Five Years

First Sample is: Female Professors

Second Sample is: Male Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 243
ENTER THE FIRST SUCCESS NUMBER x1 185
ENTER THE SECOND SAMPLE SIZE n2 198
ENTER THE SECOND SUCCESS NUMBER x2 85

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_11_Gender

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.24075084	0.41301908
NORMAL THEORY	0.2446973	0.41935059

This is a social science course. Female professors were rated higher than male professors and the result is significant

What does it mean to us from the results of three courses previous analysis? Could we assume male professors are rated higher than female professors in science and engineering and female professors rated higher than male professors in social science? The results could have been influenced by a number of factors, how many female and male professors were in those two departments, how often they taught, what was their rank, etc. Therefore, we did further analysis by summing all eleven courses by professor gender.

Professors Gender For All Eleven Courses Within The Past 5 years

First Sample is: Male Professors

Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 54545
ENTER THE FIRST SUCCESS NUMBER x1 22185

ENTER THE SECOND SAMPLE SIZE n2 6958
ENTER THE SECOND SUCCESS NUMBER x2 2717

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES 5 YEARS

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.00417804	0.02919798
NORMAL THEORY	0.00406084	0.0284244

According to our statistical analysis, we found male professors were rated higher than female professors. The results are small but significant and support our second hypothesis.

If we could have done the analysis on all courses within the past five years, then we could determine whether male professors are rated higher than female professors. Within the eleven courses analyzed, more female professors (for hypothesis 2) participated than male professors but the result was that male professors were rated higher than female professors by 1.5%. Since, WPI is a technical school, so male professors might be expected to be rated higher than female professors. While we were doing our project, we asked more than fifty female students and fifty male students that we knew well about which professor gender would they prefer. More than seventy-five of them preferred male professors. These students were in our studying group and clubs and mostly they were majoring in engineering. And, as we did the analysis for each individual course, we also noticed that students, regardless of their gender, rated male professors higher than female professors.

From our own experiences as students at WPI, we found that gender does influence student evaluations, particularly when the professor's behavior in class somehow contradicts student expectations of what men and women are supposed to do. This goes for men too: men who behave in a more "feminine" manner (i.e. facilitating instead of directing) are penalized in much the same way as women who taught with a more "masculine" style.

IV.2 Conclusion

Even though we did not get results that support our hypothesis, we think that there were still many of the factors that contribute to negative ratings of female professors appeared in our study. However, we also think female professors can do several things to

help themselves to get more positive ratings from both students. Some of these suggestions are (Collings, 1998):

1. "Women faculty must signal that they are competent and knowledgeable. For example, you might talk about your qualifications on the first day of class- anything associated with status, knowledge, competence, and connections."
2. "Women faculty must appear nurturing and expressive, but not too much so. These traits must go along with competent behaviors or else the woman risks being seen as the "mother" and similarity devalued. For example, along with telling students your qualifications on the first day of class, a woman professor might also want to inform them of her willingness to help students and some ways in which she does so; for example review sessions, help with papers."
3. "Avoid too much lecturing, women who use the lecture format are rated lower than men who do so are. Encouraging active participation by students is a good predictor of student evaluations, especially for women professors."
4. "Before handing out evaluations, the female professor should review the course objectives and ask students to consider what they've learned during the term. This may help to focus students on her effectiveness as a professor rather than on her personality."

Furthermore, 25.8% of the female professors at WPI participated in our study (we have around thirty-one female professors teaching at WPI.) However, the ratio for male professors was very much different: 1.7% of the male professors participated in our study (we had around one hundred seventy-six male professors teaching at WPI.) We may have

found the results to be more significant if we could have analyzed all courses within the past five years and if all of the professors of WPI had participated in the study.

From our experiences as students, we, Khue Huynh and Tim Nguyen, think that dressing in a professional way appears more important for female professors than for male. We see that a female professor who dresses informally (e.g. jeans) seem more approachable, but does not get high ratings for respect or knowledge. Also, a female professor may gain respect by using or her title (Dr. or Professor) and last name, rather than her first names. We notice that by using a professional title, may help students break the gender stereotype set because woman are frequently thought of as possessions in the domestic sphere.

At last, from our own experiences we would like to have several comments to female professors. That smiling and eye contact appear to be particularly important for them, especially with male students. These signs may make a competent woman less threatening. It is also important to be accessible to students (e.g., post and keep regular office hours). A female professor should not, however, be endlessly available to her students. She will not get any other work done, and she will not be particularly appreciated or rewarded with high evaluations.

IV.3 What does this IQP mean for WPI?

While previous IQPs by Pritpal Singh and Hung Nguyen and Hieu Nguyen tried to improve the course evaluation form and analyzed the results of course evaluations by class characteristics, this IQP deals with the effects of professor gender and student gender. This project suggests, but does not have enough data to prove, that female professors receive lower ratings than male professors and that female professors receive their highest ratings from female students and their lowest ratings from male students. It supplies students the

knowledge that the evaluation form is not only a requirement but also a meaningful way of raising their voice about a course, a teacher, etc. So in the future, when we fill out the form, we should be honest, direct, and clear in our comment on any part of the original course evaluation form.

IV.4 Future Projects:

After finishing this IQP, we believed that students at WPI took the Course Evaluation Form seriously, so more IQPs should be done on it. We think there are many more major questions that need to be considered for future IQPs. These are that do female instructors in social science receive higher evaluations than female technology instructors? Do male technology instructors receive higher ratings than male instructors in social science? Also, the results of the evaluation form should be publicized so that both professors and students know how important the form (blue sheet) is.

References

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Appendix I

The Standard WPI Evaluation Form

WPI Worcester Polytechnic Institute

STUDENT EVALUATION OF COURSE/LAB OR CONFERENCE INSTRUCTOR

INSTRUCTOR'S NAME	TERM	DATE	COURSE NUMBER

By providing your perceptions of the effectiveness of your teacher on this evaluation form, you can help to improve the overall quality of teaching at WPI. Therefore, please take time to consider each reply thoughtfully. These evaluations are used by the teacher for self-improvement and by members of the administration and faculty committees as one important factor in determining salary, promotion and tenure.

Your response will remain anonymous. The evaluation form will be returned to your teacher after you have received a grade for the course.

Please circle the number to indicate your feeling of disagree/agree with each statement using the range from STRONGLY DISAGREE to STRONGLY AGREE. Circle NOT APPLICABLE if the particular statement does not apply to your instructor.

NA - NOT APPLICABLE
SD - STRONGLY DISAGREE D - DISAGREE A - AGREE SA - STRONGLY AGREE

	RANGE OF AGREEMENT				
	NA	SD	D	A	SA
PART I - YOUR SPECIFIC PERCEPTIONS					
1. The instructor established clear objectives for the course.	0	1	2	3	4
2. The instructor organized the course well.	0	1	2	3	4
3. The instructor was well prepared to teach each class.	0	1	2	3	4
4. The instructor communicated well.	0	1	2	3	4
5. The instructor demonstrated a good understanding of the material being taught.	0	1	2	3	4
6. The instructor used the blackboard/visual aids in an effective manner.	0	1	2	3	4
7. The instructor used class time effectively.	0	1	2	3	4
8. The instructor assigned homework that aided my learning.	0	1	2	3	4
9. The instructor used evaluations that were good measures of the material covered.	0	1	2	3	4
10. The instructor provided adequate assistance outside the classroom.	0	1	2	3	4
11. The instructor stimulated my interest in the subject matter.	0	1	2	3	4
12. The instructor challenged me to extend my capabilities.	0	1	2	3	4
13. The instructor seemed really concerned about the students.	0	1	2	3	4
14. The instructor was well above average.	0	1	2	3	4
FOR LABORATORY COURSE					
15. The instructor showed me how to use laboratory equipment properly.	0	1	2	3	4
16. The instructor provided adequate time to complete experiments.	0	1	2	3	4
17. The instructor clearly defined the requirements for preparing lab reports.	0	1	2	3	4
PART II - SOME GENERAL PERCEPTIONS					
1. The textbook(s) helped me learn the subject matter.	0	1	2	3	4
2. The material to be learned in this course was difficult.	0	1	2	3	4
3. The room used for the course was acceptable.	0	1	2	3	4
4. The lab and/or computer equipment was in good operating condition.	0	1	2	3	4
5. I rate myself in general as an excellent student.	0	1	2	3	4
6. I had a good understanding of material that was prerequisite for the course/lab.	0	1	2	3	4
7. I learned a lot in this course.	0	1	2	3	4

PART III - BACKGROUND INFORMATION

1. My current student year classification is (circle one)

1 - 1st YEAR 2 - 2nd YEAR 3 - 3rd YEAR 4 - 4th YEAR 5 - 5th YEAR 6 - GRADUATE STUDENT

My major field is (circle one)

01 - Chemical Engineering	06 - Computer Science	11 - Interdisciplinary
02 - Civil Engineering	07 - Biology	12 - Consortium
03 - Electrical Engineering	08 - Management	13 - Other
04 - Mechanical Engineering	09 - Mathematical Sciences	
05 - Chemistry	10 - Physics	

Appendix II

The Back Side of the Standard WPI Evaluation Form

PART IV- WRITTEN COMMENTS

1.What did you particularly like about this course/lab?

2.What did you particularly dislike about this course/lab?

3.Can you suggest anything that the instructor can do to improve the quality of teaching?

4.What strategy would you advise a friend to use to benefit from this course?

5. Other comments?

Appendix III
Revised Form as Administerred to Student

WPI Worcester Polytechnic Institute

STUDENT EVALUATION OF COURSE/LAB OR CONFERENCE INSTRUCTOR

INSTRUCTOR'S NAME	TERM	DATE	COURSE NUMBER

Your instructor has given us permission to collect data for our IQP on the effect of gender on course evaluations. Copies of these forms, with part III removed, will be given to your instructor to provide midterm course feedback. Therefore, please take time to consider each reply thoughtfully.
Your response will remain anonymous.
Please circle the number to indicate your feeling of disagree/agree with each statement using the range from STRONGLY DISAGREE to STRONGLY AGREE. Circle NOT APPLICABLE if the particular statement does not apply to your instructor.

NA - NOT APPLICABLE
SD - STRONGLY DISAGREE **D - DISAGREE** **A - AGREE** **SA - STRONGLY AGREE**

	RANGE OF AGREEMENT				
	NA	SD	D	A	SA
PART I - YOUR SPECIFIC PERCEPTIONS					
1. The instructor established clear objectives for the course.	0	1	2	3	4
2. The instructor organized the course well.	0	1	2	3	4
3. The instructor was well prepared to teach each class.	0	1	2	3	4
4. The instructor communicated well.	0	1	2	3	4
5. The instructor demonstrated a good understanding of the material being taught.	0	1	2	3	4
6. The instructor used the blackboard/visual aids in an effective manner.	0	1	2	3	4
7. The instructor used class time effectively.	0	1	2	3	4
8. The instructor assigned homework that aided my learning.	0	1	2	3	4
9. The instructor used evaluations that were good measures of the material covered.	0	1	2	3	4
10. The instructor provided adequate assistance outside the classroom.	0	1	2	3	4
11. The instructor stimulated my interest in the subject matter.	0	1	2	3	4
12. The instructor challenged me to extend my capabilities.	0	1	2	3	4
13. The instructor seemed really concerned about the students.	0	1	2	3	4
14. The instructor was well above average.	0	1	2	3	4
FOR LABORATORY COURSE					
15. The instructor showed me how to use laboratory equipment properly.	0	1	2	3	4
16. The instructor provided adequate time to complete experiments.	0	1	2	3	4
17. The instructor clearly defined the requirements for preparing lab reports.	0	1	2	3	4
18. The lab and/or computer equipment was in good operating condition.	0	1	2	3	4
PART II - SOME GENERAL PERCEPTIONS					
1. The textbook(s) helped me learn the subject matter.	0	1	2	3	4
2. The material to be learned in this course was difficult.	0	1	2	3	4
3. The room used for the course was acceptable.	0	1	2	3	4
4. I rate myself in general as an excellent student.	0	1	2	3	4
5. I had a good understanding of material that was prerequisite for the course/lab.	0	1	2	3	4
6. I learned a lot in this course.	0	1	2	3	4
7. This course involved a lot of group learning.	0	1	2	3	4
8. I preferred the group assignments in this class to the individual assignments.	0	1	2	3	4

PART III - BACKGROUND INFORMATION

1. Class: Freshman Sophomore Junior Senior
2. Gender _____ M _____ F
3. My major field is

Appendix IV

A Letter to Professors

Email sent to professors to solicit their participation.

Dear professors,

Would you like to get mid-term course evaluation feedback from the students in your class this term?

My IQP partner and I have teamed up to research a study about the effect of instructor gender and student gender on course evaluations. To meet our project schedule, data collection must be in the middle of C term. We will need data from a number of classes.

If you choose to participate, we will stop by your class once in the next few weeks and distribute a copy of the standard WPI course evaluation form to your students. The only change is that students will be asked to indicate their gender on the form. You may choose whether or not to ask your students to fill out the back (comments) side of the form, depending on how much class time you wish to allocate to the exercise. We need only the front side data. As soon as we have photocopied the front side of the forms only, we will give you the original forms for your own use (turnaround should be no more than a few days). We guarantee that your individual course evaluation results will be held in complete confidence. All data reporting will be anonymous (no individual instructor names or identifying information used), and we will treat the evaluation forms as confidential documents.

This IQP project is being conducted by Khue Huynh and Timothy Nguyen, and advised by Judy Miller and Carolina Ruiz. If you would like to participate, we must hear from you by Wednesday, Feb. 3.

We thank you for your participating in our project.

Sincerely yours,

Khue Huynh
Timothy Nguyen

Appendix V
The Evaluation Form Back to Professors

WPI Worcester Polytechnic Institute

STUDENT EVALUATION OF COURSE/LAB OR CONFERENCE INSTRUCTOR

INSTRUCTOR'S NAME	TERM	DATE	COURSE NUMBER

Your instructor has given us permission to collect data for our IQP on the effect of gender on course evaluations. Copies of these forms, with part III removed, will be given to your instructor to provide midterm course feedback. Therefore, please take time to consider each reply thoughtfully.
Your response will remain anonymous.
Please circle the number to indicate your feeling of disagree/agree with each statement using the range from STRONGLY DISAGREE to STRONGLY AGREE. Circle NOT APPLICABLE if the particular statement does not apply to your instructor.

NA - NOT APPLICABLE
SD - STRONGLY DISAGREE **D - DISAGREE** **A - AGREE** **SA - STRONGLY AGREE**

	RANGE OF AGREEMENT				
	NA	SD	D	A	SA
PART I - YOUR SPECIFIC PERCEPTIONS					
1. The instructor established clear objectives for the course.	0	1	2	3	4
2. The instructor organized the course well.	0	1	2	3	4
3. The instructor was well prepared to teach each class.	0	1	2	3	4
4. The instructor communicated well.	0	1	2	3	4
5. The instructor demonstrated a good understanding of the material being taught.	0	1	2	3	4
6. The instructor used the blackboard/visual aids in an effective manner.	0	1	2	3	4
7. The instructor used class time effectively.	0	1	2	3	4
8. The instructor assigned homework that aided my learning.	0	1	2	3	4
9. The instructor used evaluations that were good measures of the material covered.	0	1	2	3	4
10. The instructor provided adequate assistance outside the classroom.	0	1	2	3	4
11. The instructor stimulated my interest in the subject matter.	0	1	2	3	4
2. The instructor challenged me to extend my capabilities.	0	1	2	3	4
13. The instructor seemed really concerned about the students.	0	1	2	3	4
14. The instructor was well above average.	0	1	2	3	4
FOR LABORATORY COURSE					
15. The instructor showed me how to use laboratory equipment properly.	0	1	2	3	4
16. The instructor provided adequate time to complete experiments.	0	1	2	3	4
17. The instructor clearly defined the requirements for preparing lab reports.	0	1	2	3	4
18. The lab and/or computer equipment was in good operating condition.	0	1	2	3	4
PART II - SOME GENERAL PERCEPTIONS					
1. The textbook(s) helped me learn the subject matter.	0	1	2	3	4
2. The material to be learned in this course was difficult.	0	1	2	3	4
3. The room used for the course was acceptable.	0	1	2	3	4
4. I rate myself in general as an excellent student.	0	1	2	3	4
5. I had a good understanding of material that was prerequisite for the course/lab.	0	1	2	3	4
6. I learned a lot in this course.	0	1	2	3	4
7. This course involved a lot of group learning.	0	1	2	3	4
8. I preferred the group assignments in this class to the individual assignments.	0	1	2	3	4

Course 1 During Term C 1999

First Sample is: Female Students
Second Sample is: Male Students

```
NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS        2

ENTER THE FIRST SAMPLE SIZE n1                 84
ENTER THE FIRST SUCCESS NUMBER x1              1
ENTER THE SECOND SAMPLE SIZE n2                478
ENTER THE SECOND SUCCESS NUMBER x2             36

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES      Course 1

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS       2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1)         0.95

               THE 95% CONFIDENCE INTERVAL FOR p1-p2
                                LOWER LIMIT    UPPER LIMIT
                                ---------------------------
      BOOTSTRAP                 -0.0941047     -0.0270628
      NORMAL THEORY             -0.0965394     -0.0302787
```

Appendix VII

Course 2 During Term C 1999

First Sample is: Female Students
Second Sample is: Male Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 172
ENTER THE FIRST SUCCESS NUMBER x1 77
ENTER THE SECOND SAMPLE SIZE n2 235
ENTER THE SECOND SUCCESS NUMBER x2 46

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 2

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.15663038	0.34482098
NORMAL THEORY	0.1619531	0.34190637

Appendix VIII

Course 3 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 168
ENTER THE FIRST SUCCESS NUMBER x1 54
ENTER THE SECOND SAMPLE SIZE n2 132
ENTER THE SECOND SUCCESS NUMBER x2 29

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 3

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) .95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.00001407	0.19966234
NORMAL THEORY	0.00185031	0.20161289

Appendix IX

Course 4 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 28
ENTER THE FIRST SUCCESS NUMBER x1 12
ENTER THE SECOND SAMPLE SIZE n2 53
ENTER THE SECOND SUCCESS NUMBER x2 29

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 4

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.3349057	0.11652426
NORMAL THEORY	-0.3456613	0.10846457

Appendix X

Course 5 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 146
ENTER THE FIRST SUCCESS NUMBER x1 26
ENTER THE SECOND SAMPLE SIZE n2 93
ENTER THE SECOND SUCCESS NUMBER x2 12

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 5

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) .95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.044852	0.13607763
NORMAL THEORY	-0.0431089	0.1412088

Appendix XI

Course 6 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 643
ENTER THE FIRST SUCCESS NUMBER x1 232
ENTER THE SECOND SAMPLE SIZE n2 38
ENTER THE SECOND SUCCESS NUMBER x2 1

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 6

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) .95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.2555699	0.38413686
NORMAL THEORY	0.27150003	0.39748581

Course 7 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

```
NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS       2

ENTER THE FIRST SAMPLE SIZE n1                606
ENTER THE FIRST SUCCESS NUMBER x1             28
ENTER THE SECOND SAMPLE SIZE n2               28
ENTER THE SECOND SUCCESS NUMBER x2            2

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES      Course 7

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS      2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1)        .95

               THE 95% CONFIDENCE INTERVAL FOR p1-p2
                                LOWER LIMIT    UPPER LIMIT
                                ---------------------------
     BOOTSTRAP                  -0.1405945     0.05115512
     NORMAL THEORY              -0.1220693     0.07162142
```

Appendix XIII

Course 8 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 288
ENTER THE FIRST SUCCESS NUMBER x1 222
ENTER THE SECOND SAMPLE SIZE n2 28
ENTER THE SECOND SUCCESS NUMBER x2 19

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 8

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) .95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.1175322	0.25248016
NORMAL THEORY	-0.0874048	0.27192859

NOTE: WE ANALYZED BY SUMMING SA + A. THE REASON FOR THAT BECAUSE FEMALE STUDENTS DID NOT RATE ANY UNDER SA.

Appendix XIV

Course 9 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 180
ENTER THE FIRST SUCCESS NUMBER x1 62
ENTER THE SECOND SAMPLE SIZE n2 118
ENTER THE SECOND SUCCESS NUMBER x2 40

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 9

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.1064497	0.11506591
NORMAL THEORY	-0.1046004	0.11552321

Appendix XV

Course 10 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 1067
ENTER THE FIRST SUCCESS NUMBER x1 483
ENTER THE SECOND SAMPLE SIZE n2 347
ENTER THE SECOND SUCCESS NUMBER x2 165

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 10

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) .95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.0863948	0.03798985
NORMAL THEORY	-0.0832731	0.03760656

Course 11 During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 154
ENTER THE FIRST SUCCESS NUMBER x1 61
ENTER THE SECOND SAMPLE SIZE n2 56
ENTER THE SECOND SUCCESS NUMBER x2 27

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course 11

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.2386364	0.06006494
NORMAL THEORY	-0.2380073	0.06592935

Appendix XVII

Professors Gender For Course 1 Within Past Five Years

First Sample is: Male Professors
Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 876
ENTER THE FIRST SUCCESS NUMBER x1 199
ENTER THE SECOND SAMPLE SIZE n2 406
ENTER THE SECOND SUCCESS NUMBER x2 88

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_1_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.0407064	0.0569092
NORMAL THEORY	-0.038326	0.05916635

Appendix XVIII

Professors Gender For Course 2 Within Past Five Years

First Sample is: Male Professors
Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 5911
ENTER THE FIRST SUCCESS NUMBER x1 1772
ENTER THE SECOND SAMPLE SIZE n2 3484
ENTER THE SECOND SUCCESS NUMBER x2 1019

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_2_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.0117102	0.02698529
NORMAL THEORY	-0.011794	0.02639428

Professors Gender For Course 3 Within Past Five Years

First Sample is: Male Professors
Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 757
ENTER THE FIRST SUCCESS NUMBER x1 212
ENTER THE SECOND SAMPLE SIZE n2 1607
ENTER THE SECOND SUCCESS NUMBER x2 492

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_3_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.0631047	0.0114244
NORMAL THEORY	-0.065235	0.01301963

Appendix XX

Professors Gender For Course 6 Within Past Five Years

First Sample is: Male Professors
Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 6115
ENTER THE FIRST SUCCESS NUMBER x1 1942
ENTER THE SECOND SAMPLE SIZE n2 1342
ENTER THE SECOND SUCCESS NUMBER x2 434

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_6_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.0333334	0.02045491
NORMAL THEORY	-0.0334314	0.02179506

Professors Gender For Course 7 Within Past Five Years

First Sample is: Male Professors
Second Sample is: Female Professors

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NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS       2

ENTER THE FIRST SAMPLE SIZE n1                794
ENTER THE FIRST SUCCESS NUMBER x1             241
ENTER THE SECOND SAMPLE SIZE n2               649
ENTER THE SECOND SUCCESS NUMBER x2            27

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES      Course_7_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS      2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1)        0.95

               THE 95% CONFIDENCE INTERVAL FOR p1-p2
                                LOWER LIMIT    UPPER LIMIT
                                ---------------------------
      BOOTSTRAP                 0.22581869     0.29592233
      NORMAL THEORY             0.22644484     0.29740313
```

Professors Gender For Course 8 Within Past Five Years

First Sample is: Male Professors
Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 335
ENTER THE FIRST SUCCESS NUMBER x1 150
ENTER THE SECOND SAMPLE SIZE n2 945
ENTER THE SECOND SUCCESS NUMBER x2 179

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_8_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.24075084	0.41301908
NORMAL THEORY	0.19952477	0.31716164

Appendix XXIII

Professors Gender For Course 9 Within Past Five Years

First Sample is: Male Professors
Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 1409
ENTER THE FIRST SUCCESS NUMBER x1 637
ENTER THE SECOND SAMPLE SIZE n2 262
ENTER THE SECOND SUCCESS NUMBER x2 131

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_9_GENDER

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.1159731	0.0206155
NORMAL THEORY	-0.1137914	0.01797881

Professors Gender For Course 11 Within Past Five Years

First Sample is: Female Professors
Second Sample is: Male Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 243
ENTER THE FIRST SUCCESS NUMBER x1 185
ENTER THE SECOND SAMPLE SIZE n2 198
ENTER THE SECOND SUCCESS NUMBER x2 85

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES Course_11_Gender

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.24075084	0.41301908
NORMAL THEORY	0.2446973	0.41935059

Male Professors For All Three Courses During Term C 1999

First Sample is: Male Students
Second Sample is: Female Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 1856
ENTER THE FIRST SUCCESS NUMBER x1 741
ENTER THE SECOND SAMPLE SIZE n2 478
ENTER THE SECOND SUCCESS NUMBER x2 178

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES MALE PROFESSORS

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	-0.0210956	0.07509299
NORMAL THEORY	-0.0218699	0.07559143

Female Professors For All Eight Courses During Term C 1999

First Sample is: Female Students
Second Sample is: Male Students

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 734
ENTER THE FIRST SUCCESS NUMBER x1 174
ENTER THE SECOND SAMPLE SIZE n2 2074
ENTER THE SECOND SUCCESS NUMBER x2 380

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES FEMALE PROFESSORS

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.01766286	0.08735064
NORMAL THEORY	0.01885444	0.08881834

Professors Gender For All Eleven Courses Within The Past Five Years

First sample is: Male Professors
Second Sample is: Female Professors

NORMAL THEORY AND BOOTSTRAPPING FOR POPULATION PROPORTIONS

DO YOU WANT TO WORK ON ONE OR TWO POPULATIONS?
ENTER 1 OR 2 FOR ONE OR TWO POPULATIONS 2

ENTER THE FIRST SAMPLE SIZE n1 54545
ENTER THE FIRST SUCCESS NUMBER x1 22185
ENTER THE SECOND SAMPLE SIZE n2 6958
ENTER THE SECOND SUCCESS NUMBER x2 2717

ENTER THE NAME OF THE DATA SET FOR
BOOTSTRAPPED PARAMETER ESTIMATES FIVE-YEARS

ENTER THE NUMBER OF BOOTSTRAP ITERATIONS 2000
ENTER CONFIDENCE LEVEL (BETWEEN 0 & 1) 0.95

THE 95% CONFIDENCE INTERVAL FOR p1-p2

	LOWER LIMIT	UPPER LIMIT
BOOTSTRAP	0.00417804	0.02919798
NORMAL THEORY	0.00406084	0.0284244