

Discrimination or Not?

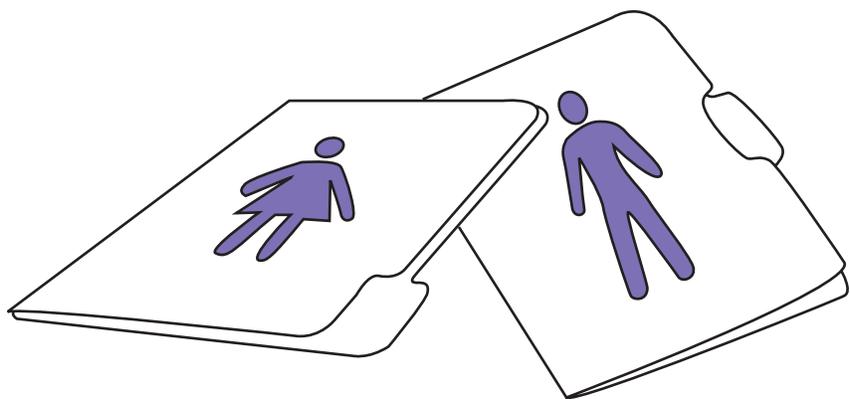
In 1972, 48 male bank supervisors were each given a personnel file and asked to judge whether the person represented in the file should be recommended for promotion to a branch-manager job described as “routine” or whether the person’s file should be held and other applicants interviewed. The files were identical except that half of the supervisors had files labeled “male” while the other half had files labeled “female.” Of the 48 files reviewed, 35 were recommended for promotion.

(From Rosen, Benson, and Thomas H. Jerdee, “Influence of Sex-Role Stereotypes on Personnel Decisions,” *Journal of Applied Psychology* 59 [February 1974], pp. 9–14)

If you knew the numbers of “male” and “female” folders selected for promotion, and the selected “male” folders outnumbered the selected “female” folders, could you conclude that discrimination against women played a role in the bank supervisors’ recommendations?

You will be exploring this *question of interest* in the following activities:

- What Would You Expect?
- Simulating the Case
- Analyzing Simulation Results



What Would You Expect?

Name _____

Read (or reread) the scenario presented in the activity sheet “Discrimination or Not?” The steps in the following activity will help you take a closer look at the data in the scenario. In answering the following questions, assume that 48 candidates were considered for promotion, as in the actual study.

1. Suppose that the recommendations of male and female candidates showed no evidence of discrimination on the basis of gender.
 - a. How many males would you then expect to be recommended for promotion? How many females?
 - b. Enter the values in table 1.

Table 1

No Discrimination by Gender

	Recommended for Promotion	Not Recommended for Promotion	Total
Male	_____	_____	24
Female	_____	_____	24
Total	35	13	48

2. Now suppose that the recommendations for promotion showed strong evidence of discrimination against the female candidates for promotion. Complete table 2 to show a possible example of this case.

Table 2

Strong Evidence of Discrimination against Women

	Recommended for Promotion	Not Recommended for Promotion	Total
Male	_____	_____	24
Female	_____	_____	24
Total	35	13	48

3. Suppose the evidence of discrimination against the women fell into a “gray” area, making any discrimination against the women not clearly obvious without further investigation. Complete table 3 to show such a case.

Table 3

“Gray” Evidence of Discrimination against Women

	Recommended for Promotion	Not Recommended for Promotion	Total
Male	_____	_____	24
Female	_____	_____	24
Total	35	13	48

What Would You Expect? (continued)

Name _____

4. In the actual situation depicted in the scenario, the results were that out of 24 files labeled “male,” 21 candidates were recommended for promotion. Out of 24 files labeled “female,” 14 candidates were recommended. Enter the data from the actual discrimination study in table 4.

Table 4

Actual Results of Discrimination Study

	Recommended for Promotion	Not Recommended for Promotion	Total
Male	_____	_____	_____
Female	_____	_____	_____
Total	_____	_____	_____

5. Consider the numbers of males and females recommended for promotion.
- What percentage of the recommended candidates were male?
 - What percentage of the recommended candidates were female?
6. Without exploring the data any further, tell whether you think that the bank supervisors discriminated against the female candidates for promotion? How certain are you?
7. How likely do you think it is that chance variation was responsible for the smaller number of female applicants recommended for promotion? Explain your thinking.

Discussion and Extension

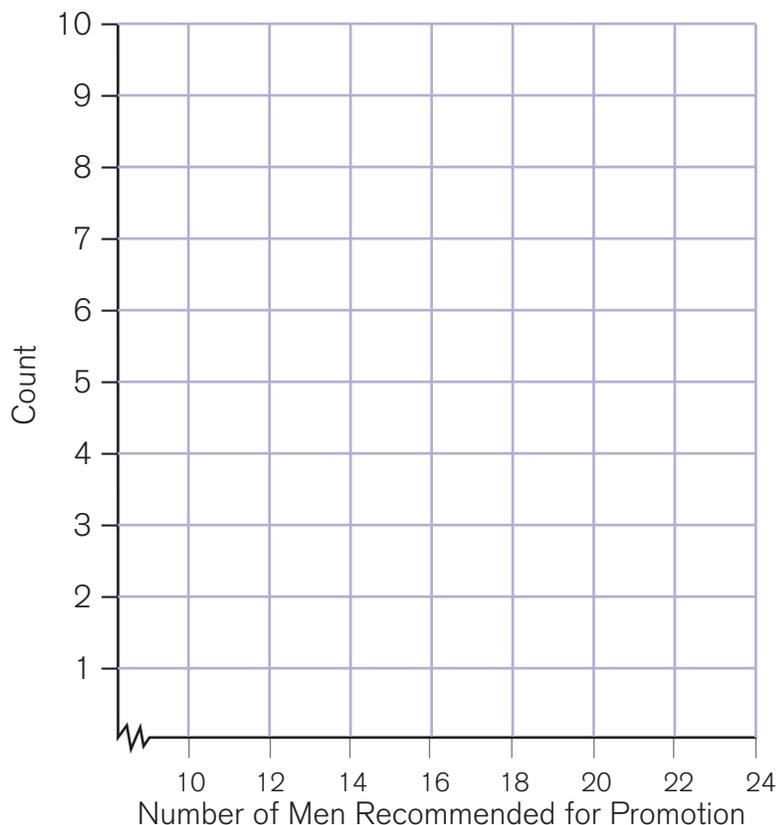
- Suppose that a group of bank supervisors looked at the files of 48 actual applicants who were basically identical in their qualifications. Of the 35 applicants that the supervisors recommended for promotion, 21 were males, and 14 were females. If a lawyer retained by the female applicants hired you as a statistical consultant, how would you go about obtaining evidence to decide whether the observed results were due to chance variation or whether they could be due to discrimination against the women?
- What thoughts do you have at this point about the manner in which the study was conducted? What would you need to assume about the study in order to infer that gender was the cause of the apparent difference between the number of females and the number of males recommended for promotion?

Simulating the Case

Name _____

Using a regular deck of 52 playing cards, remove 2 red cards and 2 black cards. Let the 24 remaining black cards represent the “male” files in the Discrimination or Not? scenario and the 24 remaining red cards represent the females. These 48 cards will simulate the 48 folders, half of which were labeled “male” and the other half, “female.”

1. Shuffle the 48 cards at least six or seven times to ensure that any cards that you are going to count are from a random process.
2. Count out the top 35 cards. Let these cards represent the applicants recommended for promotion by the bank supervisors. (Alternatively, you could conduct the simulation more efficiently by dealing out 13 cards and letting them represent the applicants who were not recommended. This process would be equivalent to dealing out 35 “recommended” cards, and it would let you tally numbers of recommended males and females more quickly and easily.)
3. Out of the 35 cards, count the number of black cards (representing the recommended males).
4. Create a dot plot by placing a blackened circle or X above the number of black cards counted each time. The range of values for possible black cards is 11 to 24.



Simulating the Case (continued)

Name _____

5. Repeat steps 1–4 nineteen more times for a total of 20 simulations.
6. Using the results (the counts) plotted on the number line, estimate the chances that 21 or more black cards (males) out of 35 would be selected if the selection process were random; that is, if there were no discrimination against the women in the selection process.
7. Look at the dot plot, and comment on the shape, center, and variability of the simulated sampling distribution of the counts by answering the following questions:
 - a. Is the simulated sampling distribution somewhat symmetrical, pulled (skewed) to the right, or pulled to the left?
 - b. Do you observe any unusual counts?
 - c. Where on the dot plot is the median of your observations?
 - d. Estimate the mean of the simulated sampling distribution representing the number of males recommended for promotion from the 20 simulations.
 - e. What counts occurred most often?
 - f. Use the dot plot to comment on the spread of the data.
8. Is the shape of this simulated sampling distribution what you might have expected? Why, or why not?

Discussion and Extension

1. Think about the question of possible discrimination against the women. On the basis of your simulations, does there appear to be evidence to support a claim that recommending 21 males out of 35 candidates recommended for promotion was due to discrimination against the women rather than to chance variation? That is, how do your simulated results compare with those of the original study?
2. How do your simulated results compare with those of your classmates?