# Factory Bias Analysis

Part 1

Sam's Concern

Glove Factory Situation

You have data from a glove factory in Louisiana. One male employee, Sam, went to the union to file a grievance that females were being favored for managerial positions.

Study the following **bar graphs** to determine if you think this is true or not.

Bar Graph presented by Sam

Gender & Number of Managerial Positions (prepared by Sam)
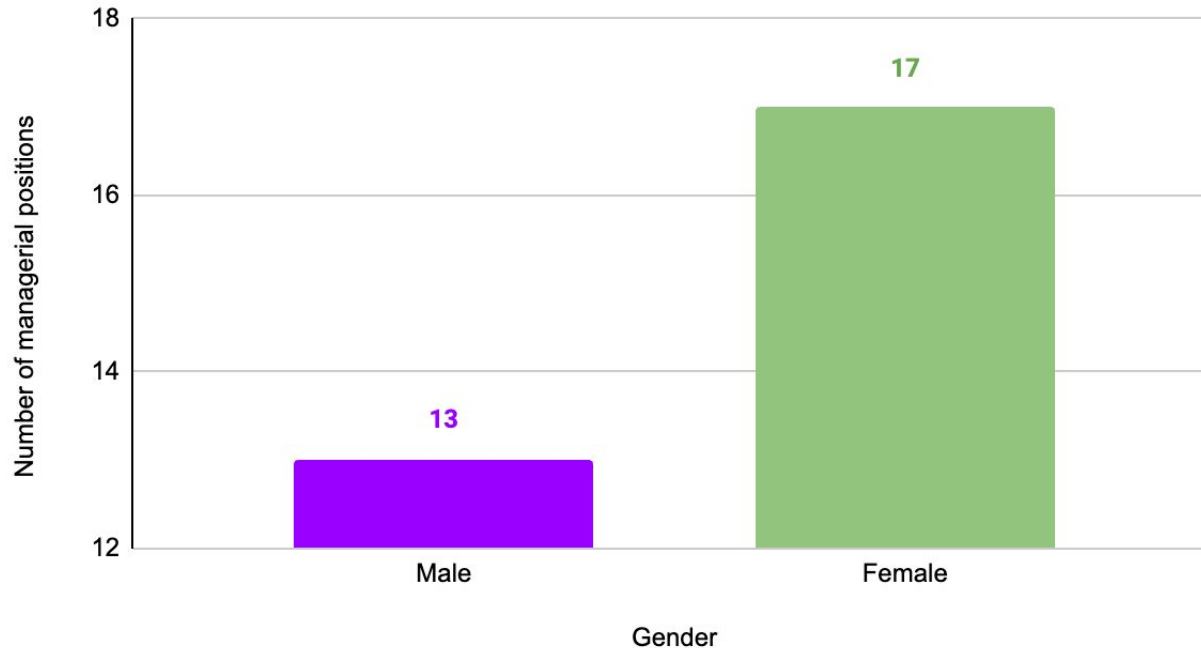
Knowledge Check

Question 1:

a) Explain the data represented in both axes.

b) Which axis represents a qualitative data set and which represents a quantitative data set?

Knowledge Check Continued

c) Study the graph carefully and discuss what you can conclude from the bar graph?

d) Do you think the sizes of the bars created by Sam are an accurate reflection of the relative magnitudes of the two quantities being compared? Explain your decision. If you think this is misrepresented, how can we create this to be a properly represented?

Bar Graph presented by Union

Gender & Number of Managerial Positions (prepared by Union)
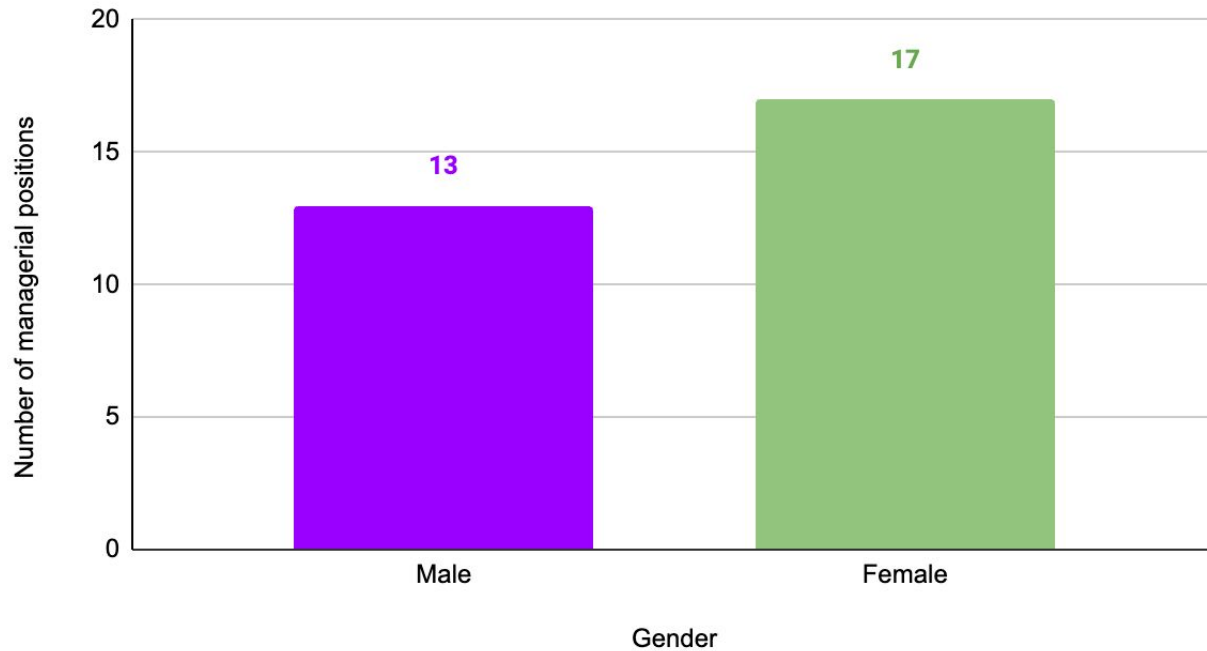
Question 2:

a) Why does Sam's bar graph look so different than the union's? Are both graphs an accurate reflection of the relative magnitudes of the two quantities being compared? Discuss.

b) Compare the both graphs; do you agree with the Sam's concern about females were being favored for managerial positions? Discuss.

c) Why do you think a bar graph is the **best representation method** for this data? Discuss.

Other Information Needed?

Question 3:

What other information might be helpful to you in looking at this situation to see if it is fair or if there is bias?

Union determined that…

- 0.59127 or about 59% of the employees are females.
- 0.40873 or about 41% of the employees are males.

Question 4: Determine the percentages of male and female managers to see if there seems to be any gender bias in promotions to managers. The following information can be used for your calculations:

- **30** total
- with **13 males** and **17 females**

**Union investigated possible bias
in hiring females by considering:**

- **Percentages** of male and female applicants to the factory.

- **Demographics** of males and females in the geographical region.

Union findings

- After investigation, the union found there was a **50/50 split between men and women** in the region.

- However, many men were working on offshore oil well rigs, where wages were much higher. Hence, there were fewer male applicants to the factory; only about **40% of the applicants were male**.

Question 5:

Suppose you are a member of the union, how are you going to explain these findings to Sam? Write a conclusion to send to Sam.
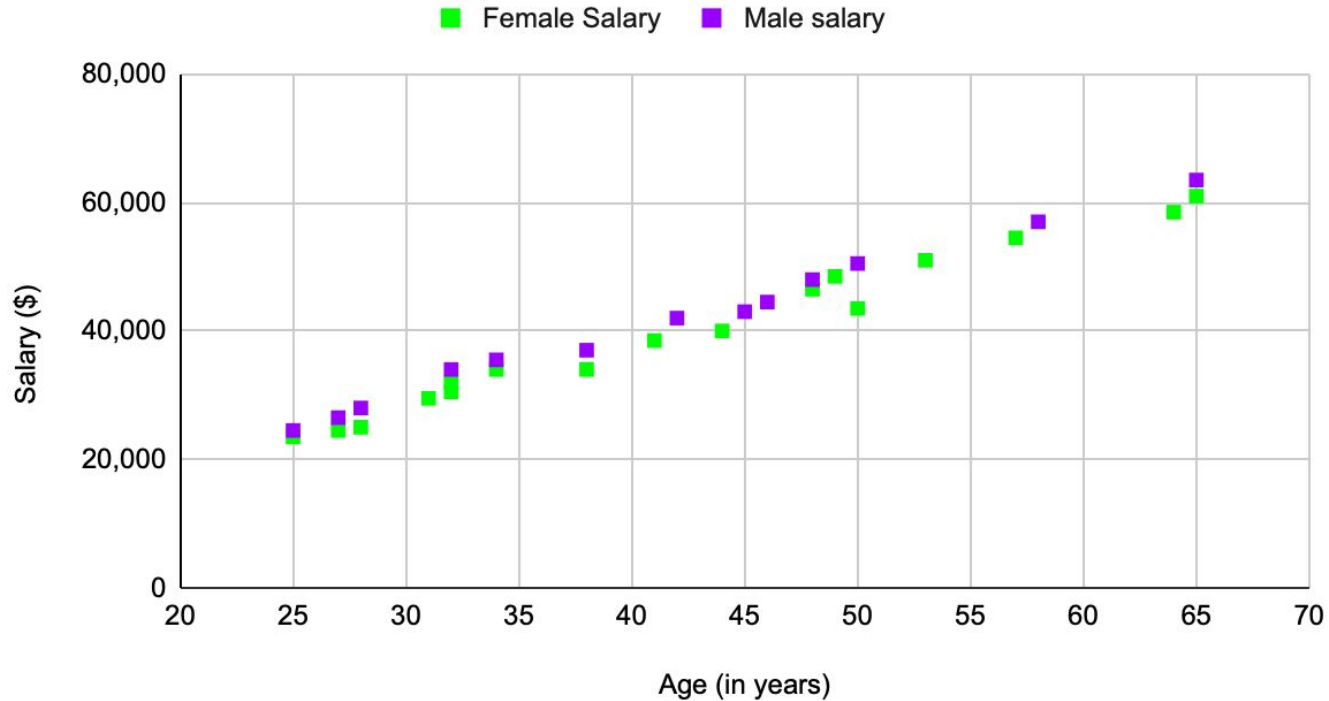
Part 2

Sally's Concern

Sally's concern

- Sally works as a manager in the same glove factory. It seems to her that females are getting paid less than males.

- She wanted to look into this; so, she decided to think through this scenario using a **graphical approach**.

- Review the **scatterplot** that Sally produced on the next slide.

Sally's first scatterplot

Worker's age vs salary

Reading the graph and categorizing data

Question 6:

a) Explain the data represented in each axis.

b) Which axis represent a qualitative data set and which represent a quantitative data set?

Should Sally go
to the union to complain?

Question 7: Based on the scatter plot, were Sally's concerns legitimate? Why or why not? What other data might she consider?

- One thing is that being older doesn't necessarily mean that an employee has worked at the factory longer. She decides that she needs to look at a scatterplot where the horizontal axis **represents the years people have worked at the factory** (rather than their ages).

Assignment with Additional Data Provided (# of Years at Factory)

- Data that you are to use are in this Google Sheet:

FACTORY HOMEWORK DATA

Here are 2 videos that might be helpful to you for this assignment

- **Google Sheets**: https://www.youtube.com/watch?v=YC1Is9YJX0k
- **MSExcel**: https://drive.google.com/file/d/1W7WWcGhuzGel0i4l3rafqFukiMP9u17H/view

What you need to submit

1. **Create and Analyze a Scatter Plot**
   a) **Submit a scatter plot** with the years at the factory as the horizontal axis input data. Then, the salary will be the output (on the vertical axis).
   - Chart should include a **title, labels for the vertical and horizontal axes, legend and the appropriate units on the axes**.
   - Get the best fitted lines (Trendlines) to the data sets relevant to male and female managers.

b) What can you see from the best fitted lines? Discuss.

c) Use your new scatter plot to argue if Sally's concern is something that she should bring to the union or not. **Explain your decision**.

d) Why do you think a scatter plot is the **best representation method** for this data? Discuss your answer using the relationship of two quantitative variables and two distinct qualitative categories described in the scenario.

Part 3

Simon's Concern

Simon's Concern

- Simon works as a manager in the same glove factory. He thinks that his graveyard shift is more productive than all other shifts.

- He wanted to analyze this so he requisition the productivity data from the glove factory.

Productivity Data
(# of cases per shift)

- Data that you are to use are in this Google Sheet:

Productivity Data

What you need to submit

2. **Analyze the productivity data**

   a) Does this scenario describe a qualitative or quantitative data? If the data is quantitative, classify as discrete or continuous quantitative data? Explain.

   b) Determine the graph or chart that best represents the data. Explain your choice.

c) Create the graph or chart using proper labeling including a chart title.

d) Use your graph to determine if Simon's assumption is correct. Explain.

3. Write a guide on how the union can analyze and respond to such inquiries in the future.