

# Visualizing Distributions

- **Classifications of distributions**
  - **Characteristics of graphical displays of distributions**
  - **Are classifications ever inappropriate**

# Uniform or Rectangular Distribution

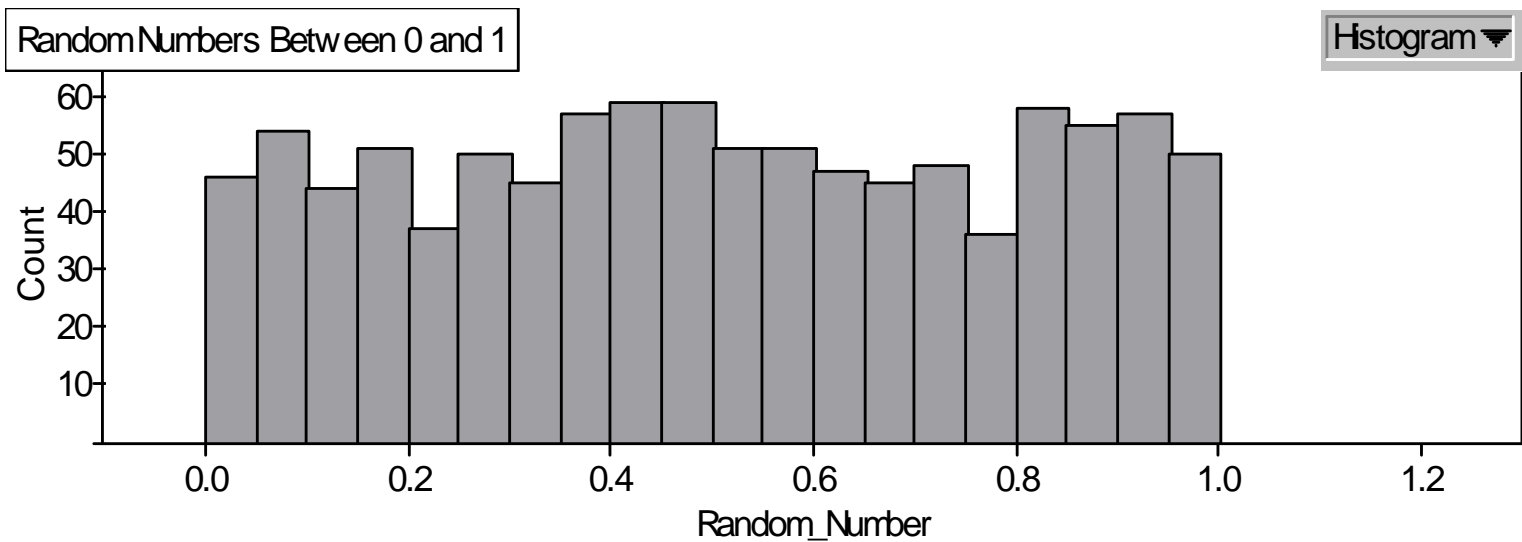
- Relatively little change in data values

# Uniform or Rectangular Distribution

- Relatively little change in data values
- Relatively symmetric

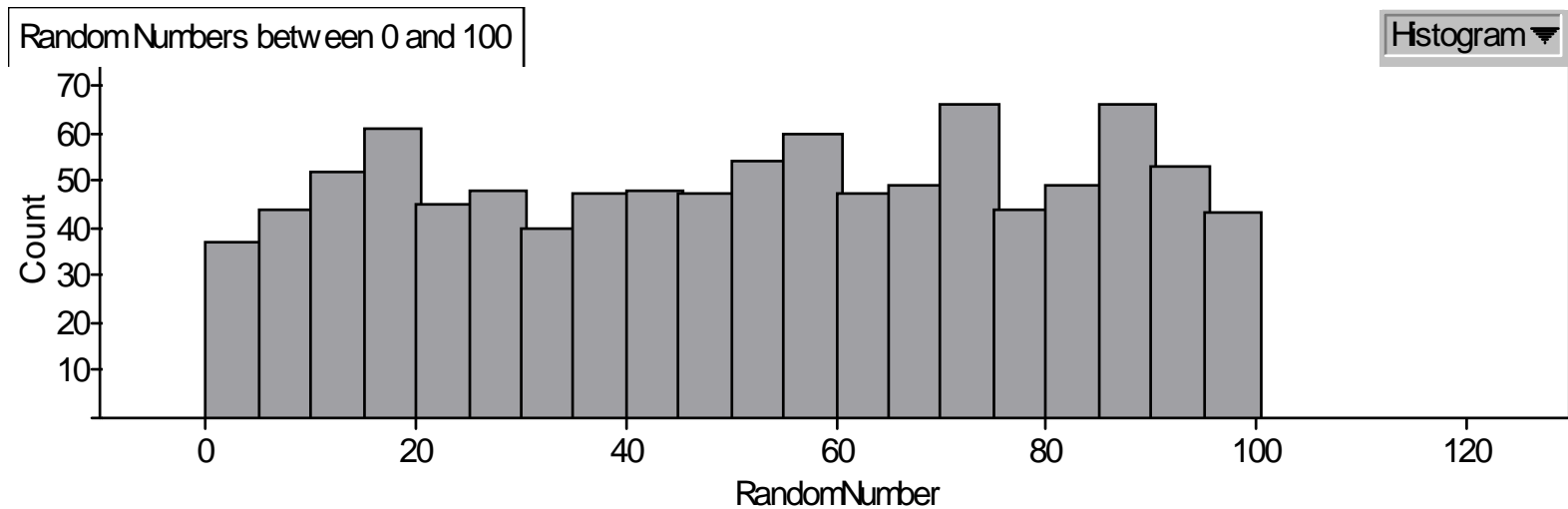
# Uniform or Rectangular Distribution

- Relatively little change in data values



# Uniform or Rectangular Distribution

- Relatively little change in data values



# Normal Distribution

- Characterized by a “bell-shaped curve”
- Values *piled up* around some central value with few values on the low side and few values on the high side of this central value
- Distribution is relatively symmetric around center value

# Normal Distribution

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- A normal distribution is also known as a bell-shaped distribution.

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# Normal Distribution

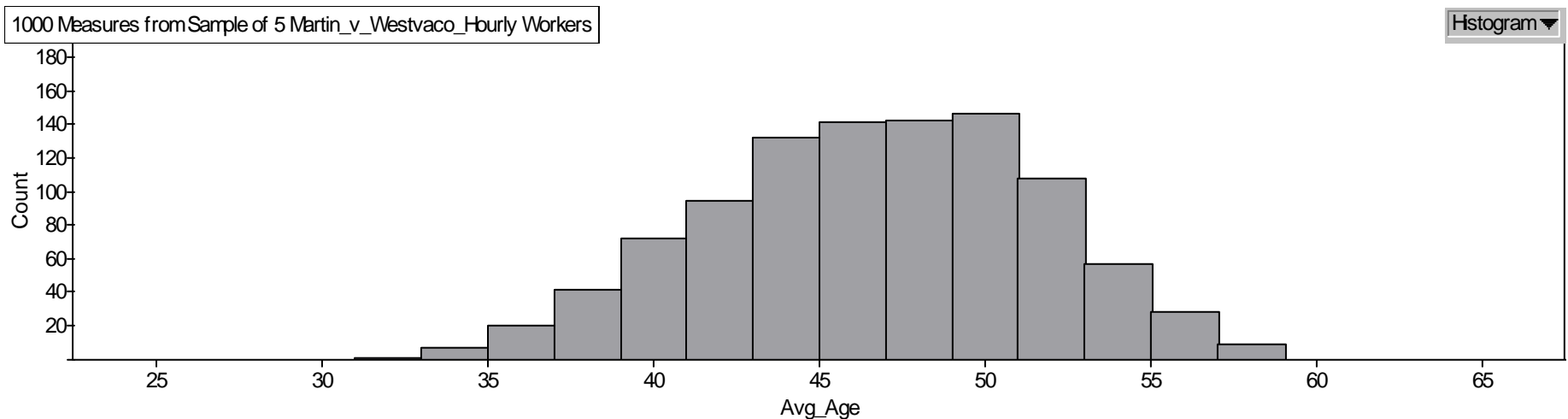
- The standard name for this distribution is the normal distribution.
- A normal distribution is also known as a bell-shaped distribution.
- There is NO such distribution as a bell-shaped curve symmetric distribution *or any other variation.*

# Normal Distribution

- The standard name for this distribution is the normal distribution.
- A normal distribution is also known as a bell-shaped distribution.
- Be careful to use appropriate, correct terminology: refer to the distribution as normal or bell-shaped.

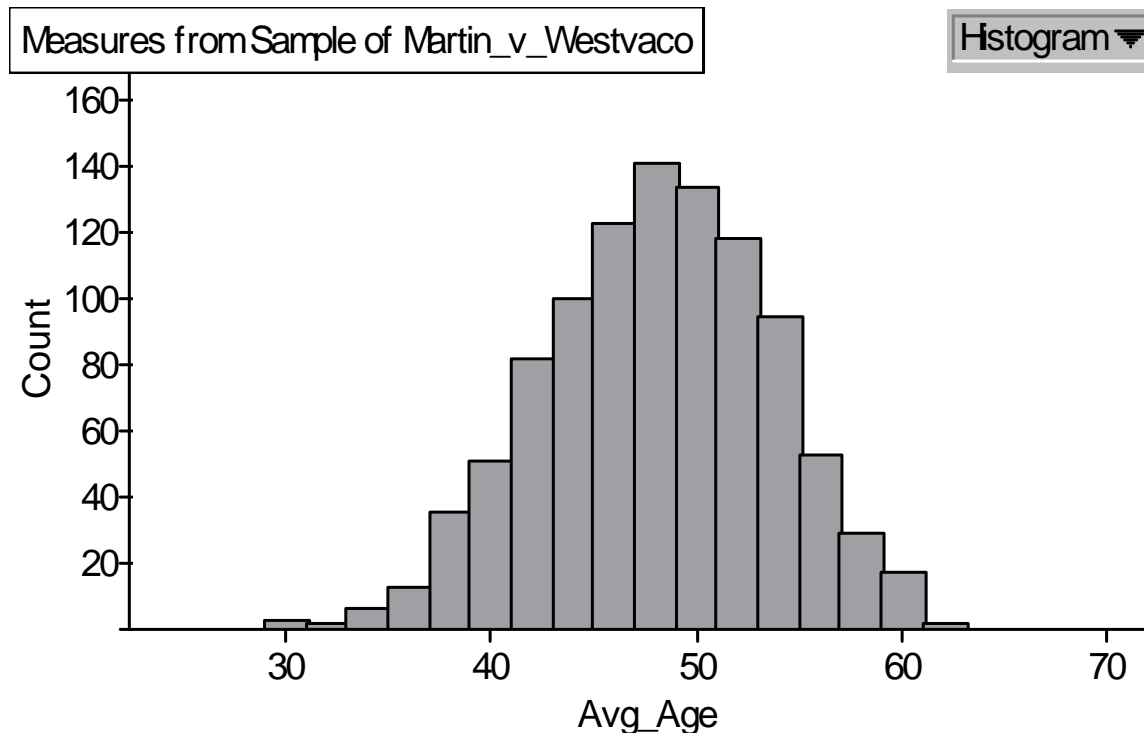
# Normal Distribution

- 1000 measures of average age for random samples of 5 Martin V. Westvaco Hourly workers



# Normal Distribution

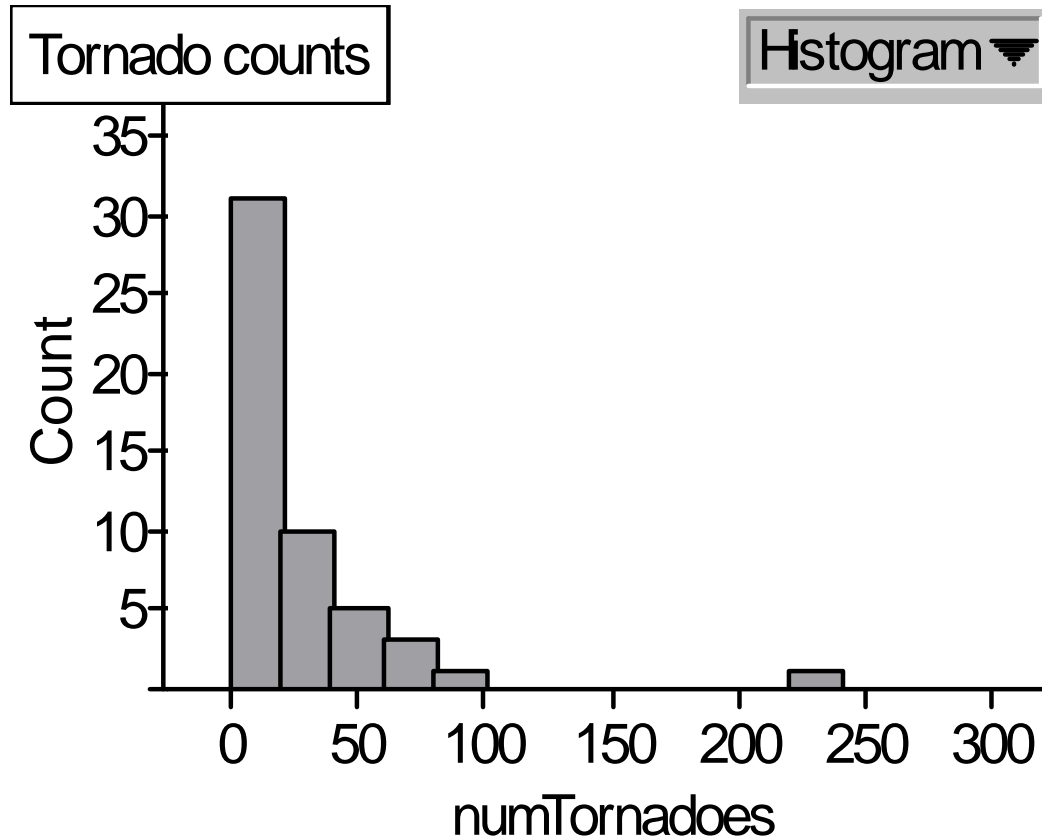
- 1000 measures of average age for random sample of 5 Martin V. Westvaco workers



# Skewed Distributions

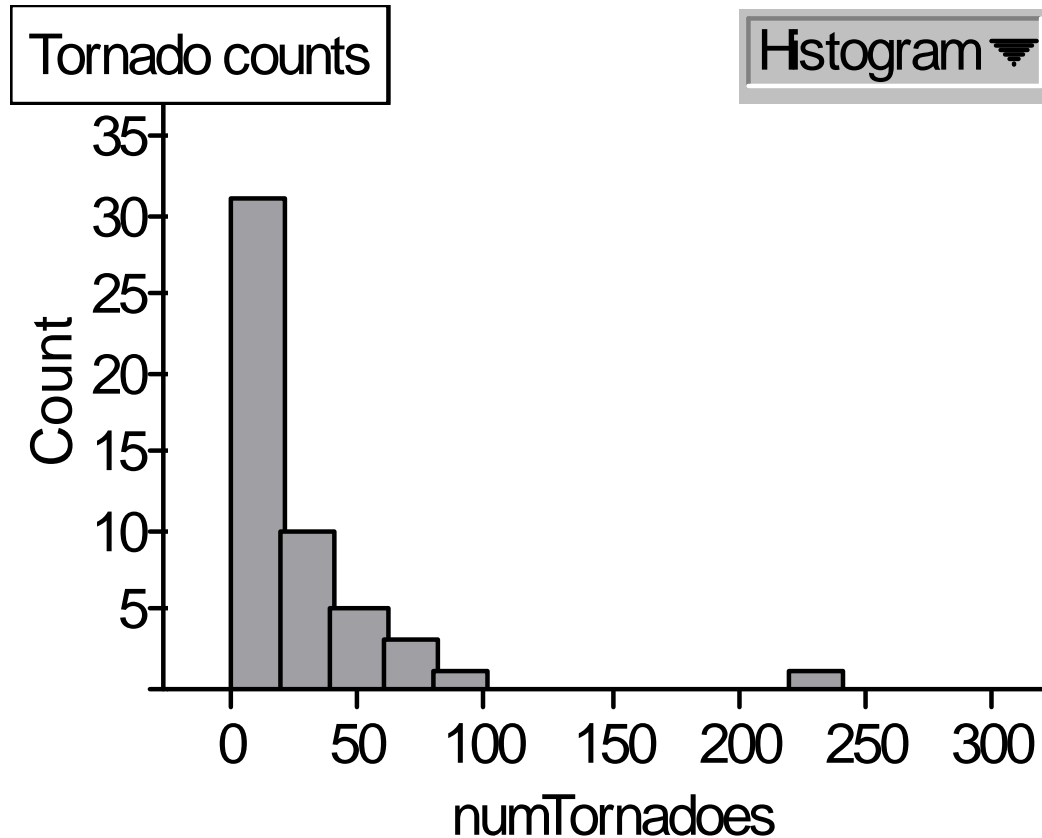
- *Bunching* at one end and a *long tail* stretching out in the other direction
- Direction of tail indicates if distribution is
  - *Skewed to left* - data tails off to the left
  - *Skewed to right* - data tails off to the right
- *One peak*

# Skewed Distribution



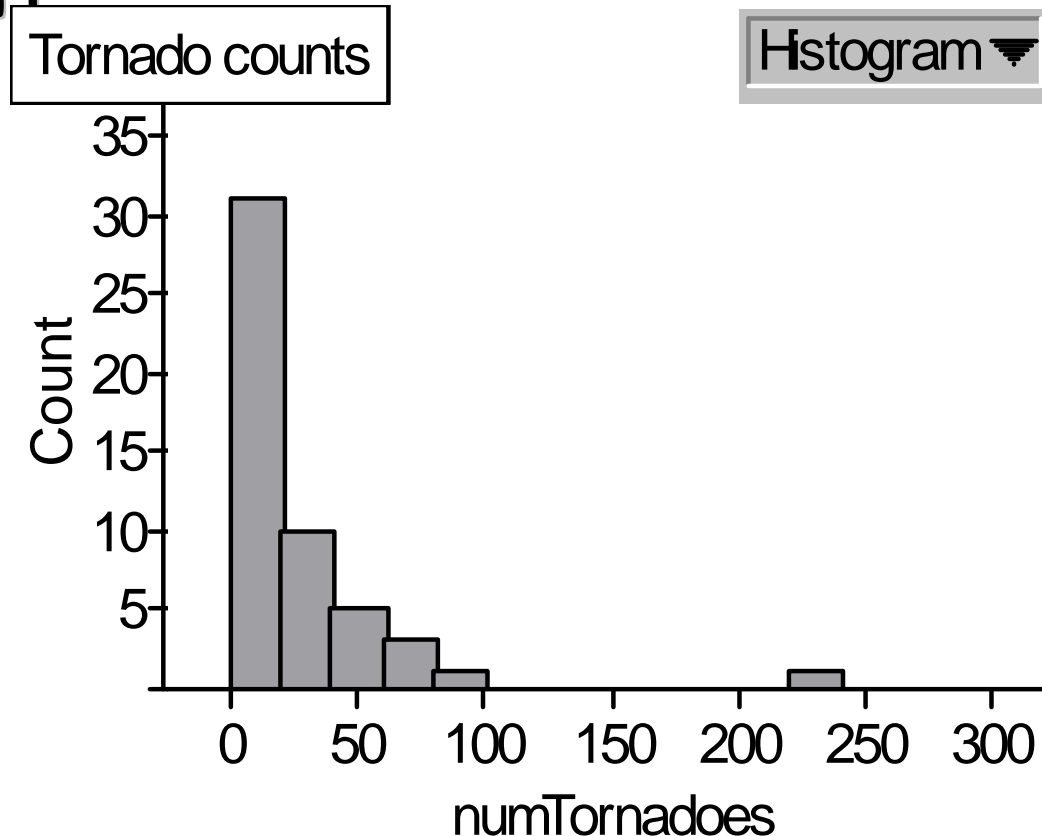
# Skewed Distribution

- How is this distribution skewed?

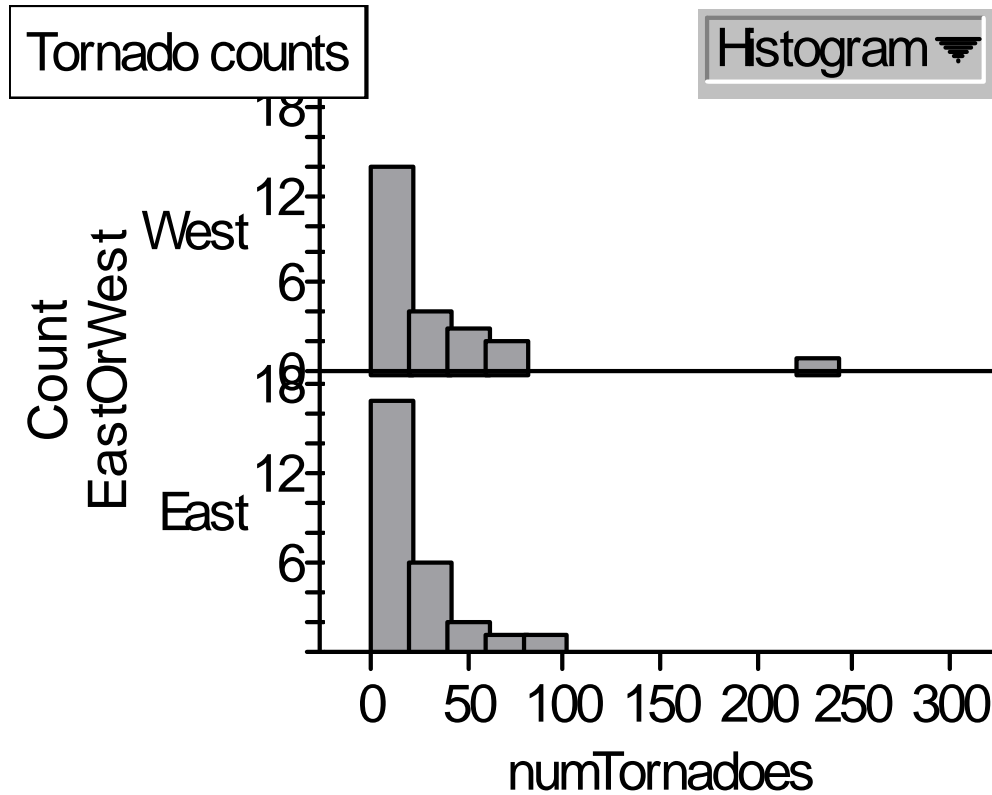


# Skewed Distribution

- The distribution is skewed to the right: the data tails off to the right and there is one peak to the left

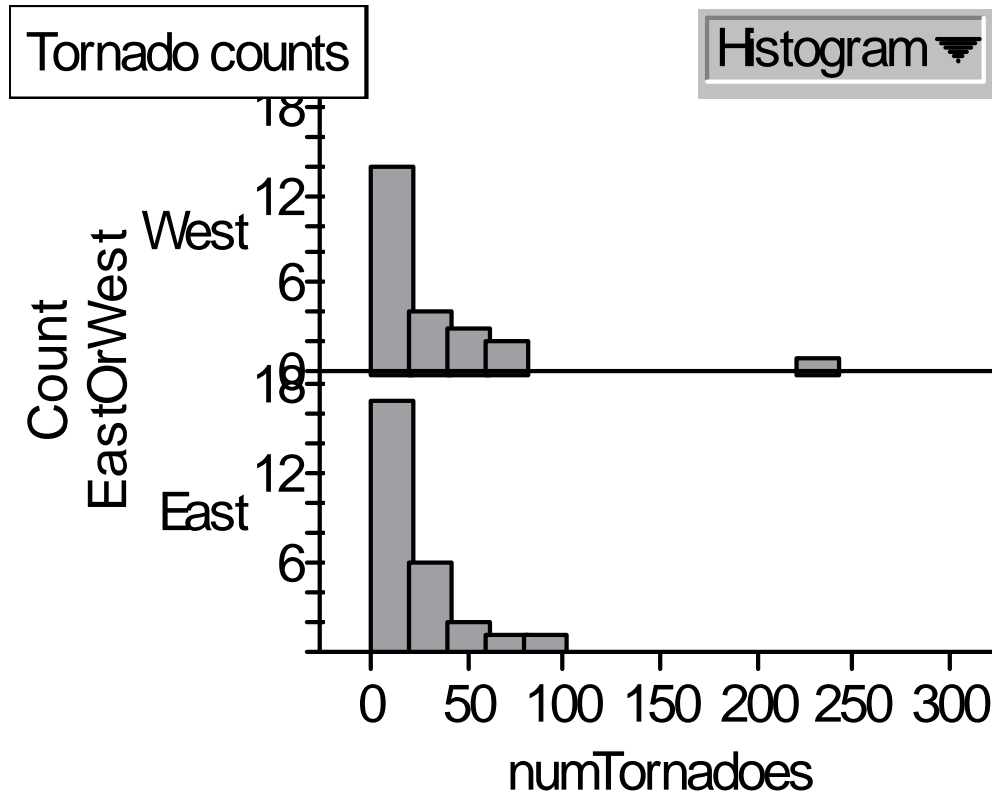


# Skewed Distribution



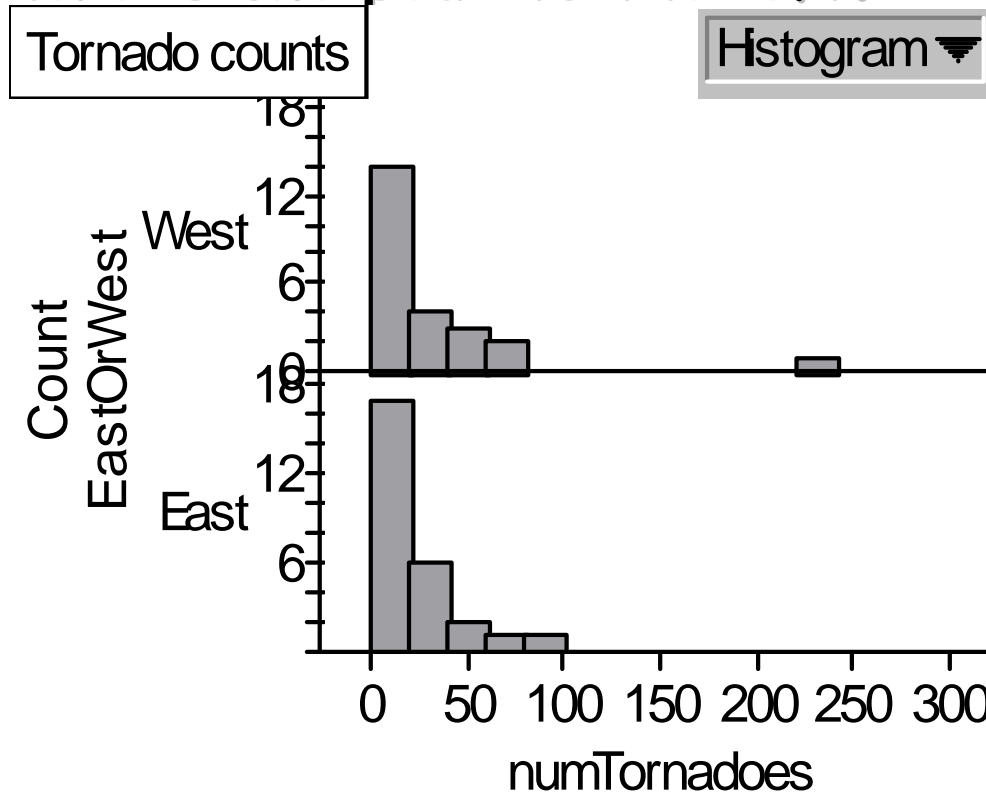
# Skewed Distribution

- How are these distribution skewed?



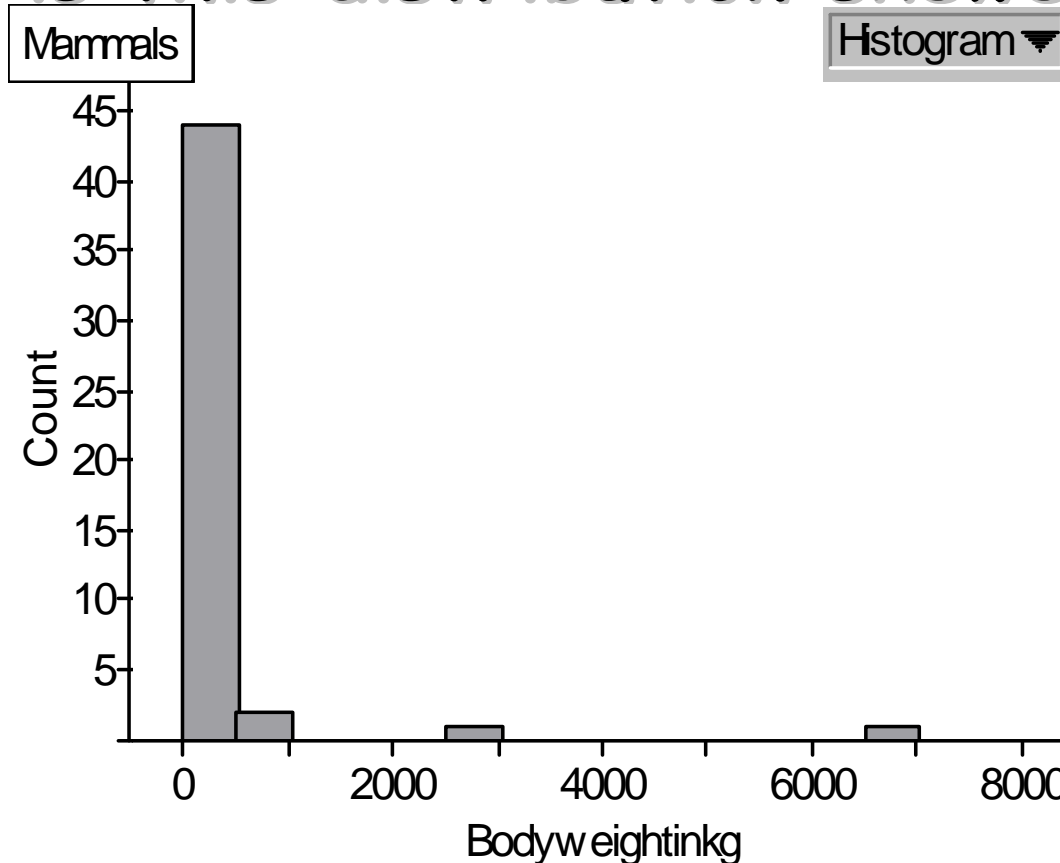
# Skewed Distribution

- Each distribution is skewed to the right: the data for each distribution tails off to the right and there is one peak to the left.



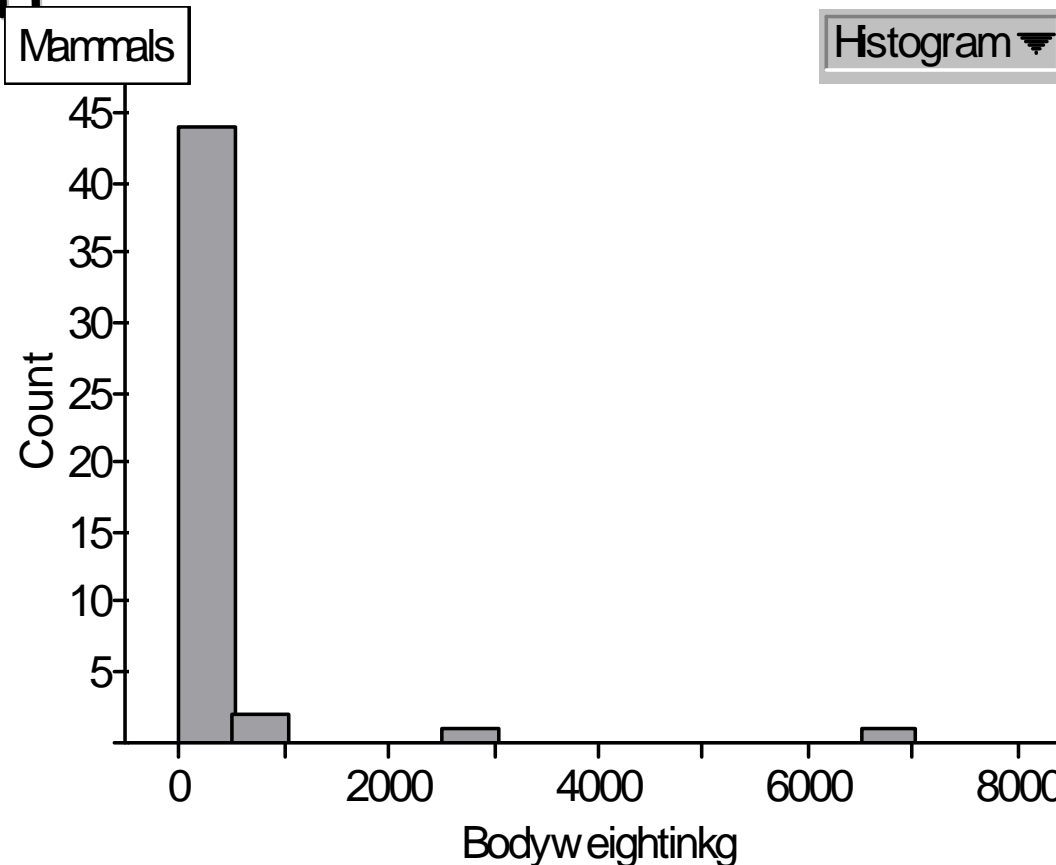
# Skewed Distribution

- How is this distribution skewed?



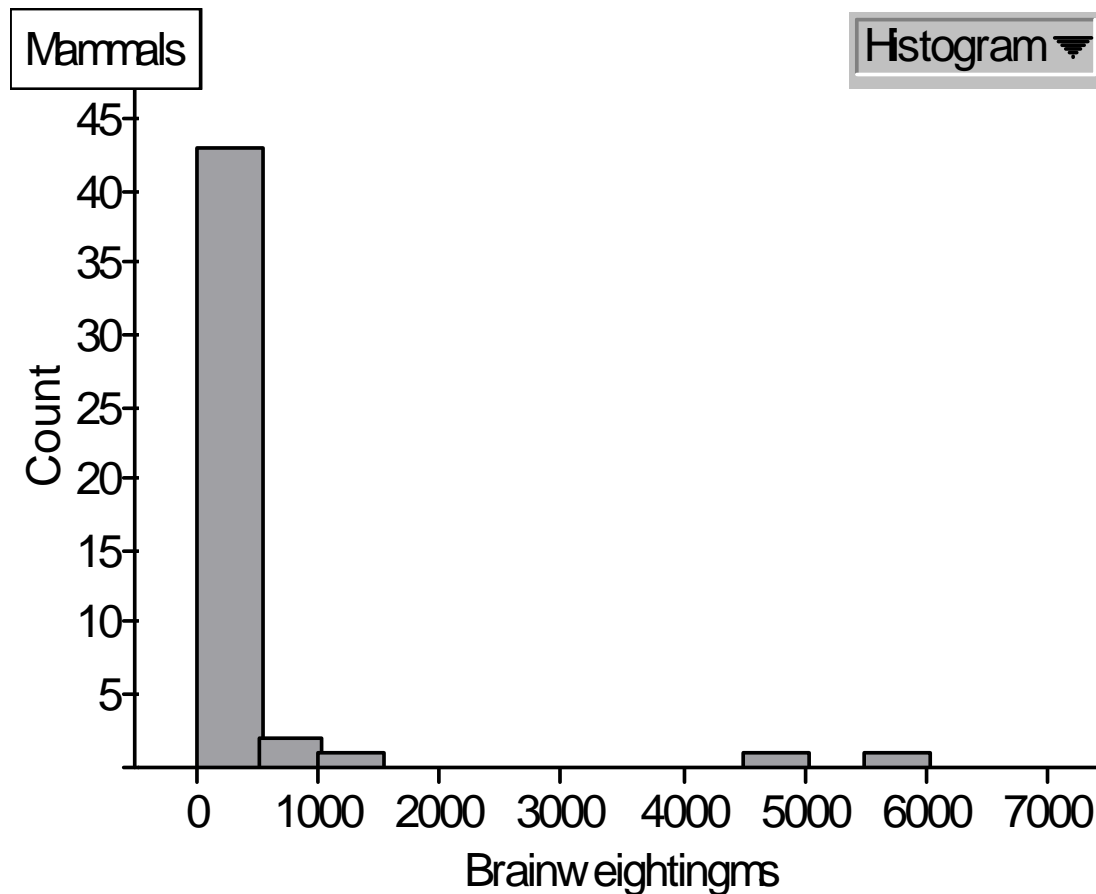
# Skewed Distribution

- The distribution is skewed to the right: the data tails off to the right and there is one peak to the left



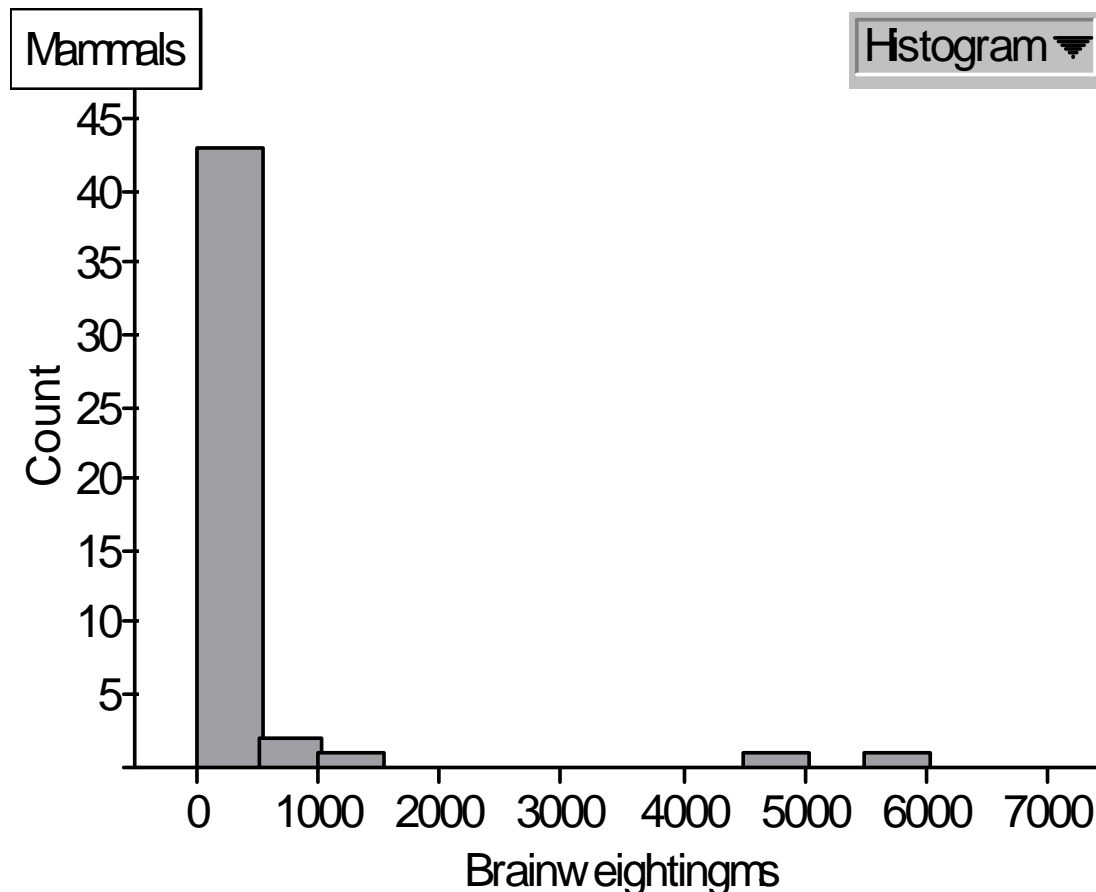
# Skewed Distribution

- How is this distribution skewed?



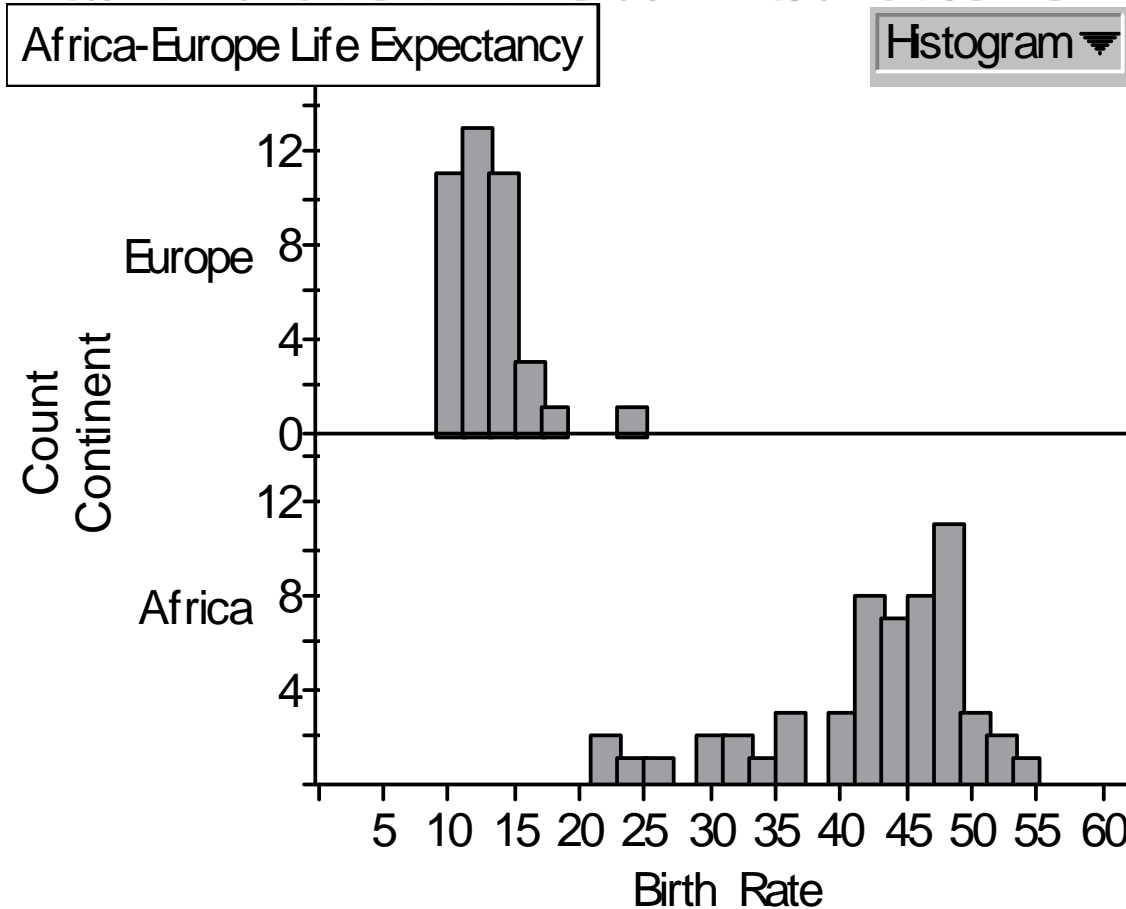
# Skewed Distribution

- The distribution is skewed to the right: the data tails off to the right and there is one peak to the left.



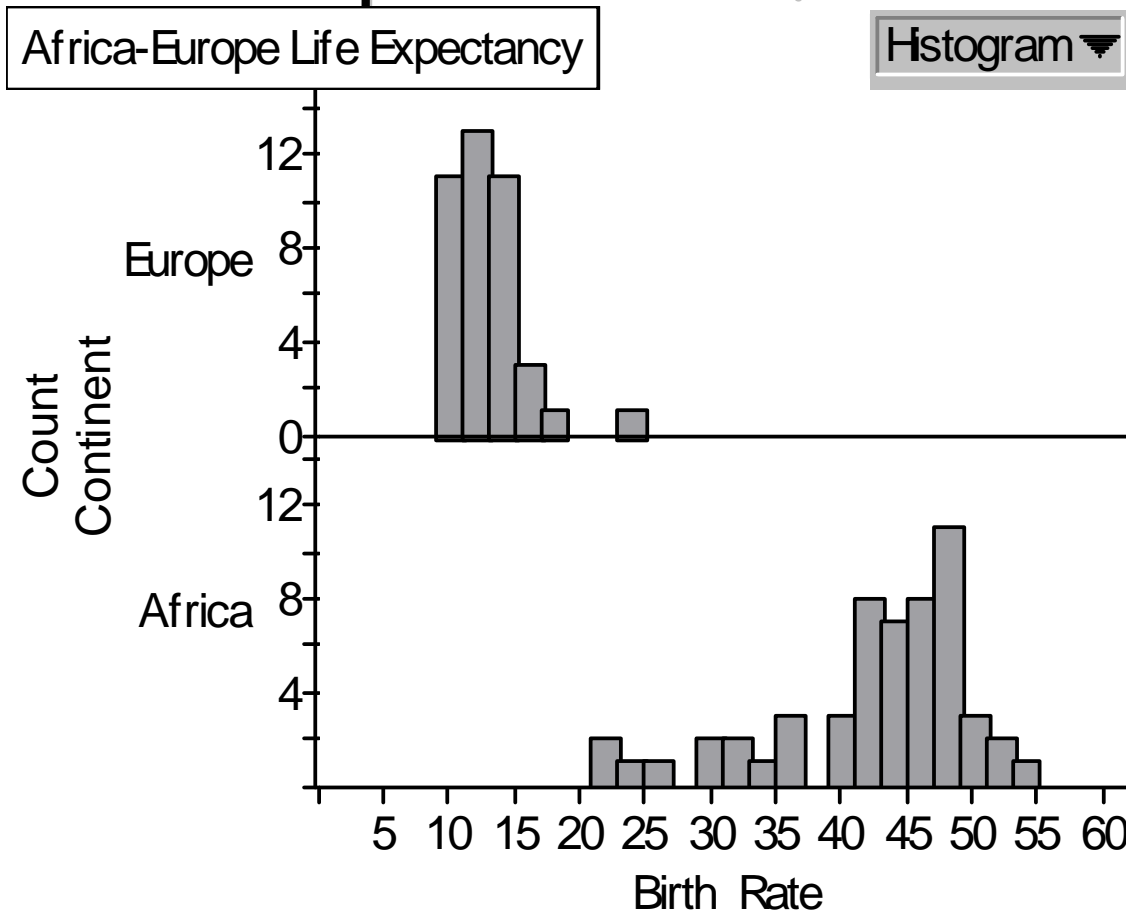
# Skewed Distribution

- How are these distributions skewed?



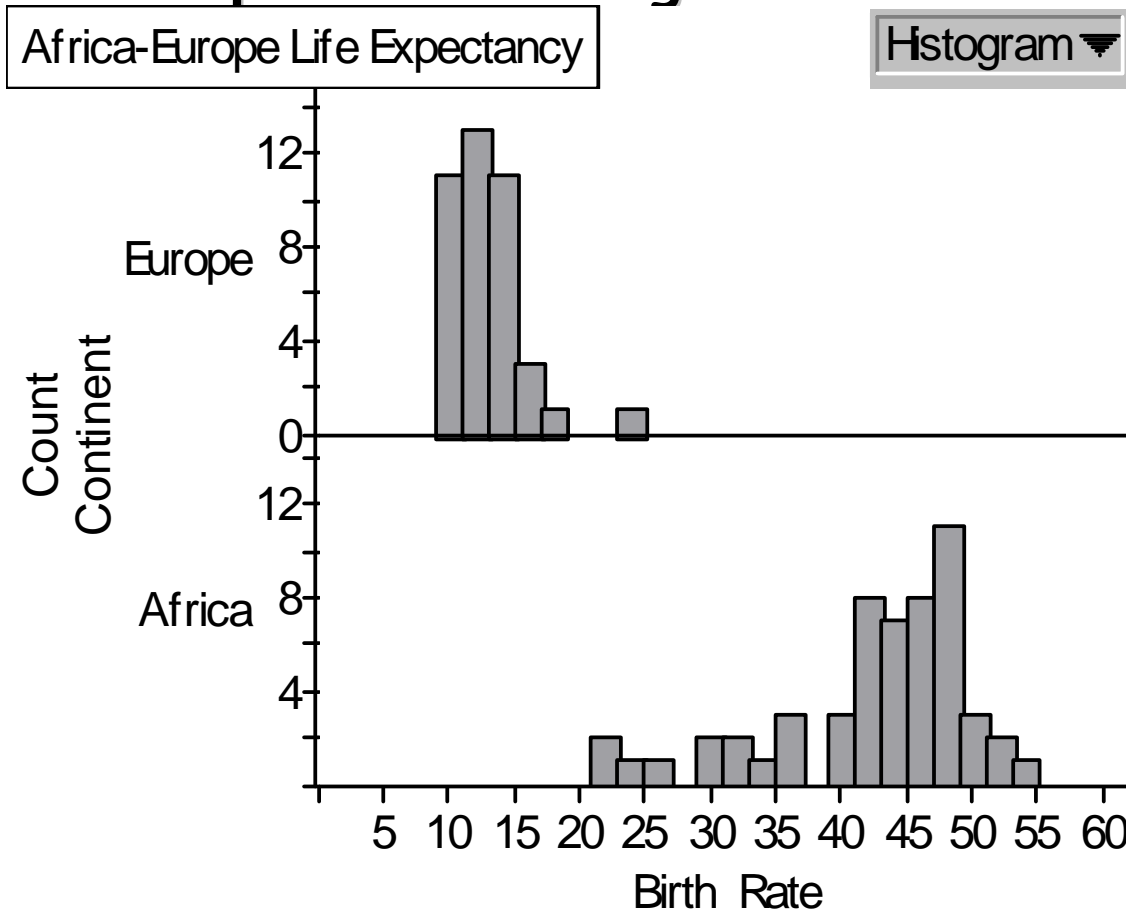
# Skewed Distribution

- The distribution for the life expectancy in Europe is skewed to the right: the data tails off to the right and there is one peak to the left.



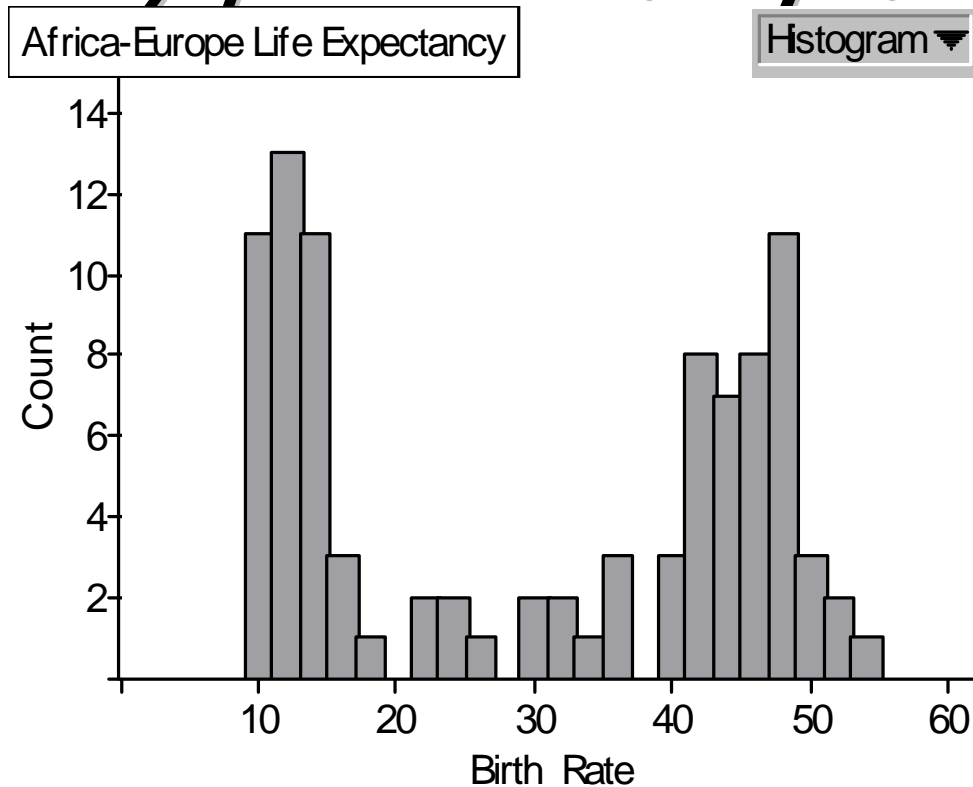
# Skewed Distribution

- The distribution for the life expectancy in Africa is skewed to the left: the data tails off to the left and there is one peak to the right.



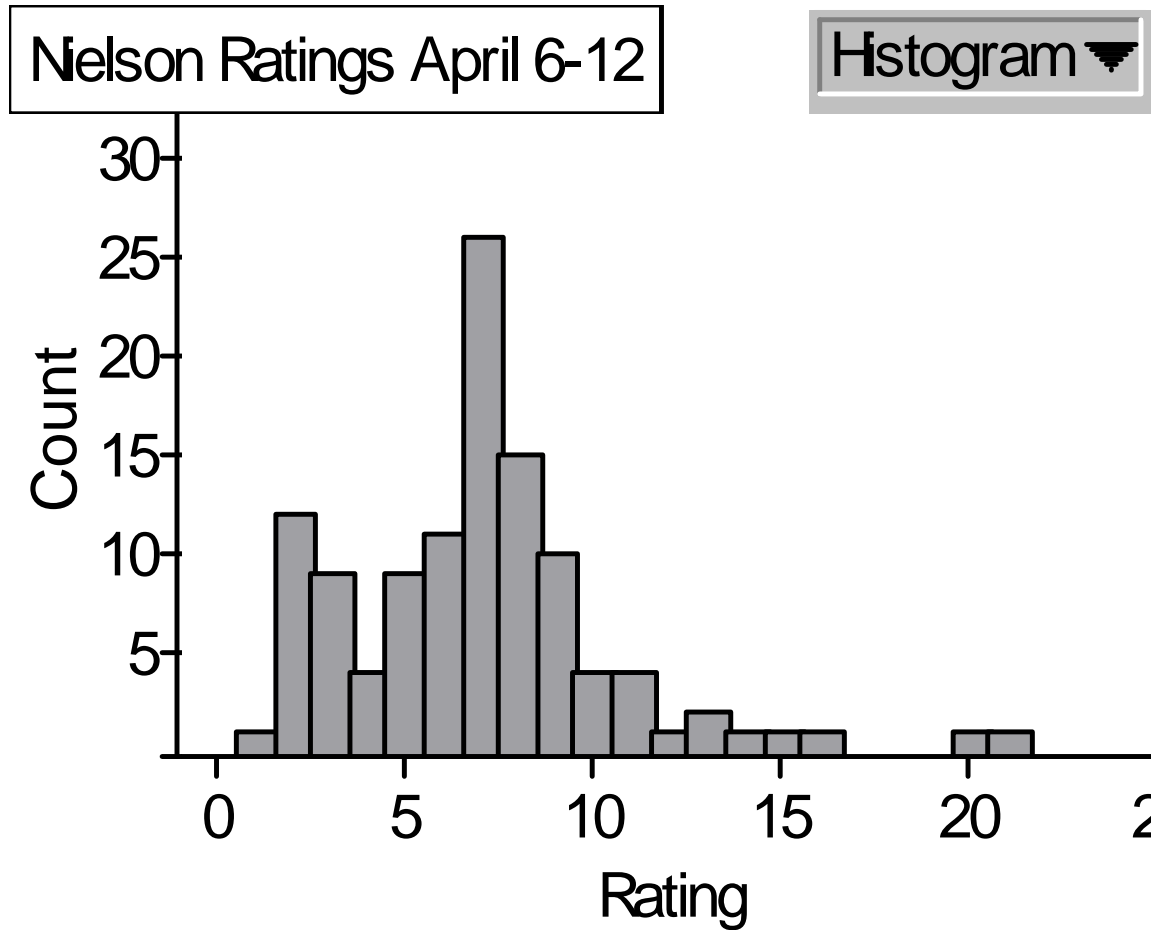
# Bimodal or Multimodal Distributions

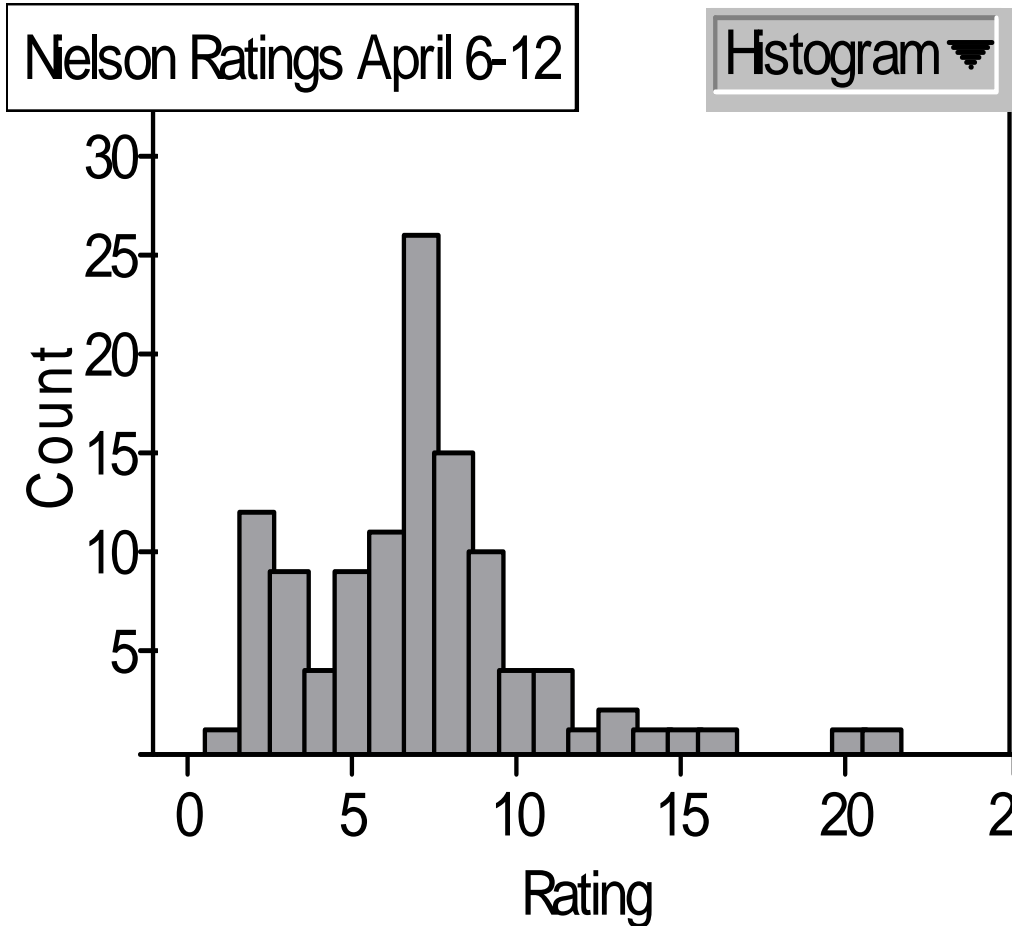
- *Two peaks* or two modes - Bimodal
- *Many peaks* or many modes -



**Multimodal**

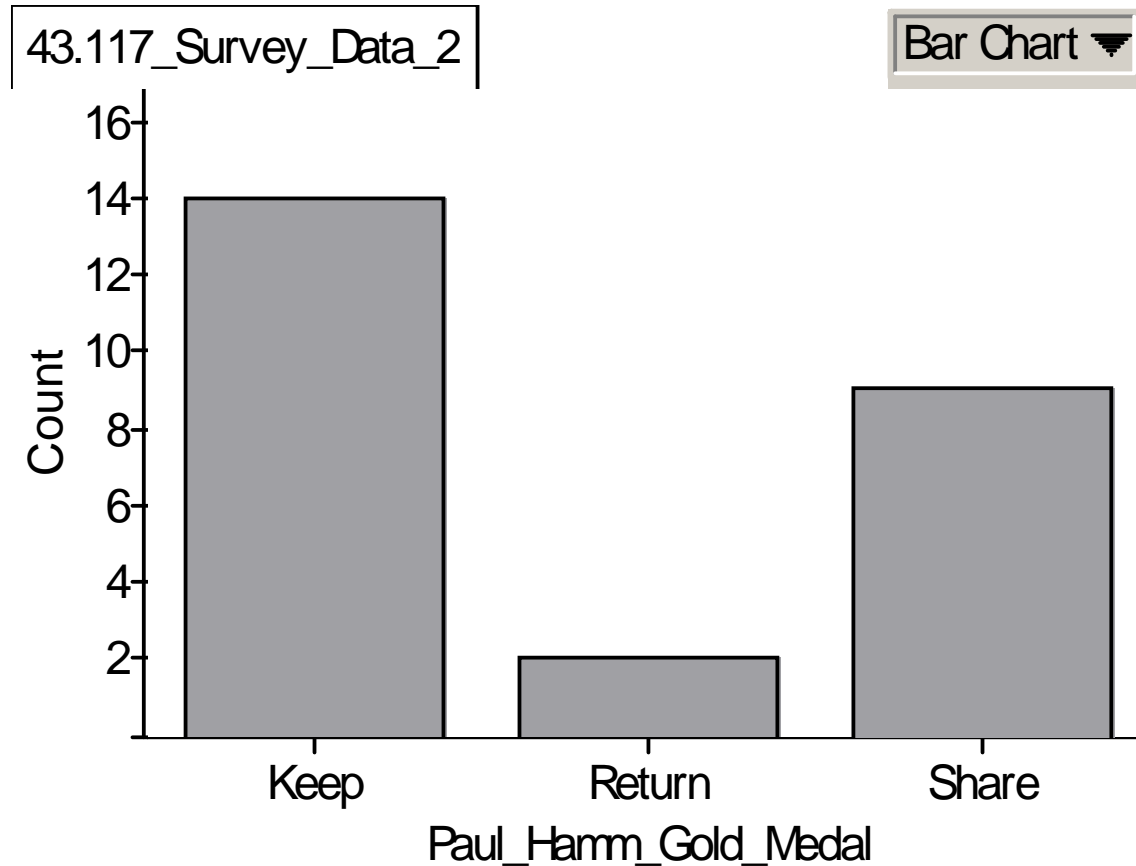
# *Describe the distribution*





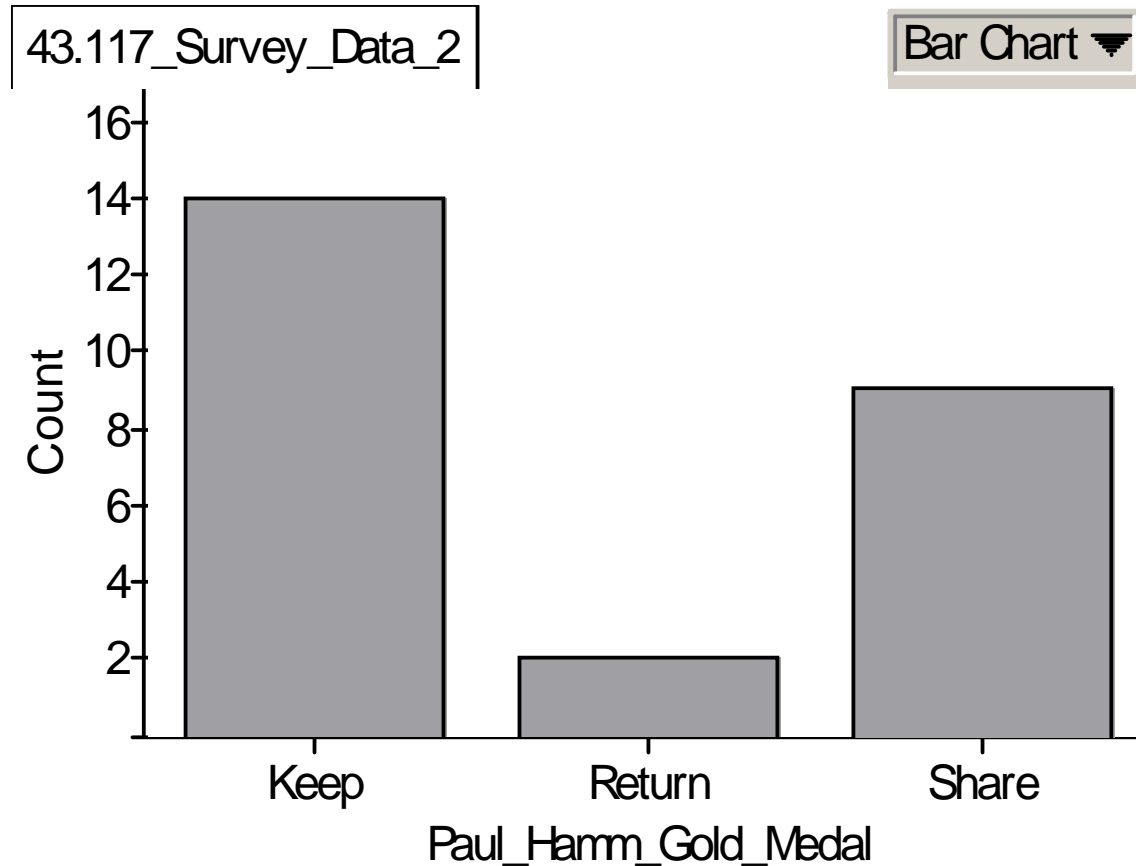
Since there is no distinct pair of peaks, we cannot classify this distribution as bimodal; we cannot use the 5 unit change in frequency among the ratings of 3, 4, and 5 as evidence that there are two peaks. So, we classify the distribution as skewed to the right: the data tails off to the right and there is one peak to the left; the data values "pile up" on the left.

Discuss the graph below and, if possible, classify the distribution.



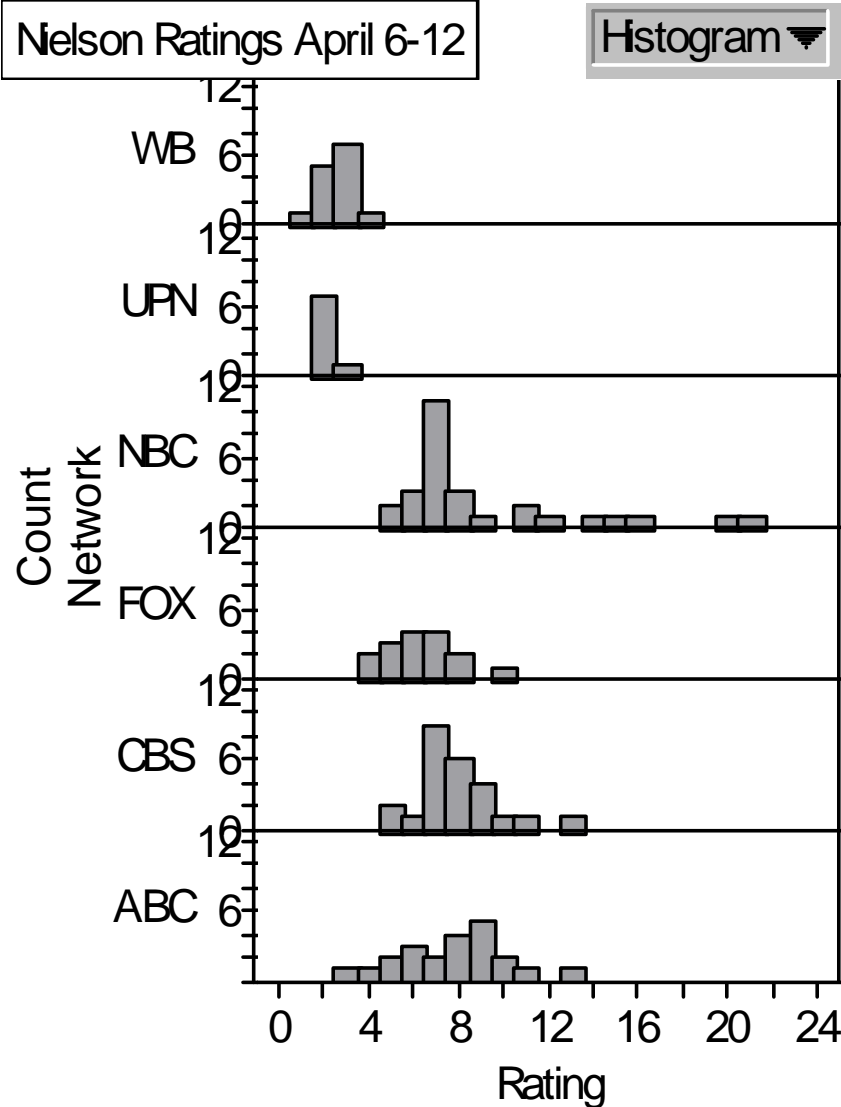
count ( )

We cannot classify this distribution because the data is qualitative/categorical. Only distributions for quantitative variables can be classified.

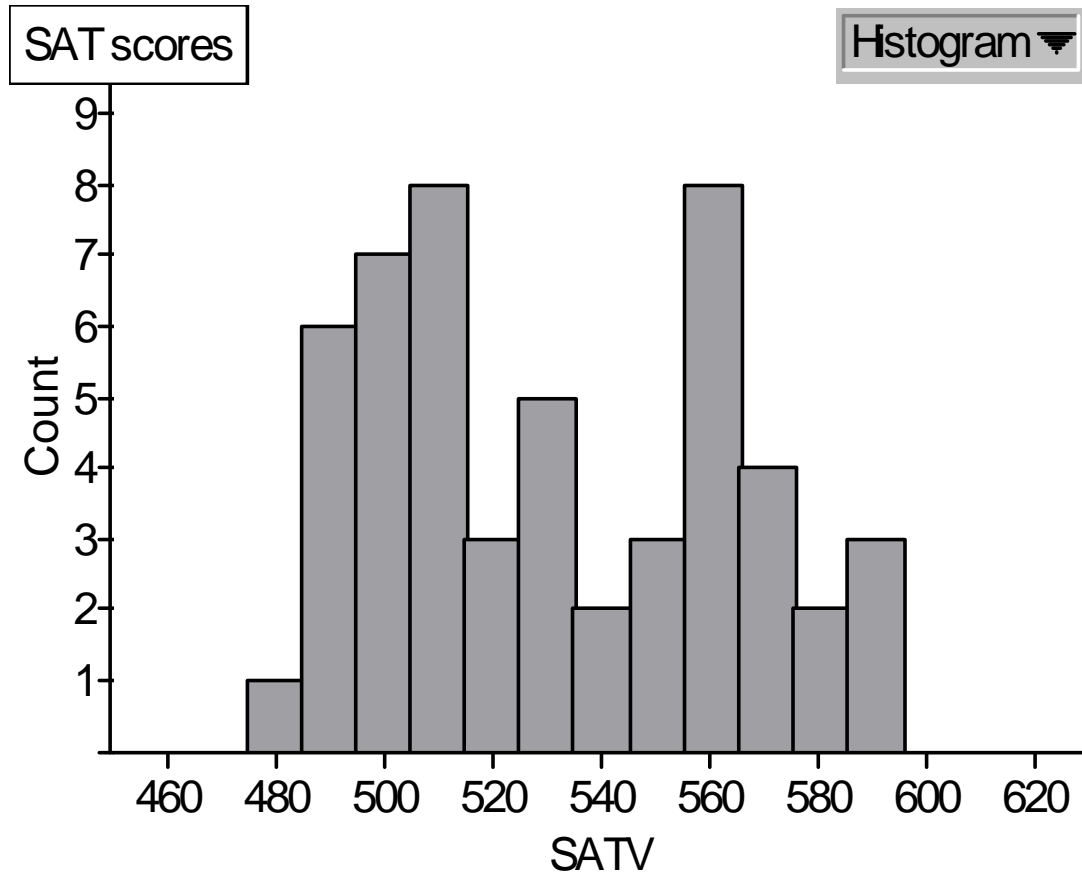


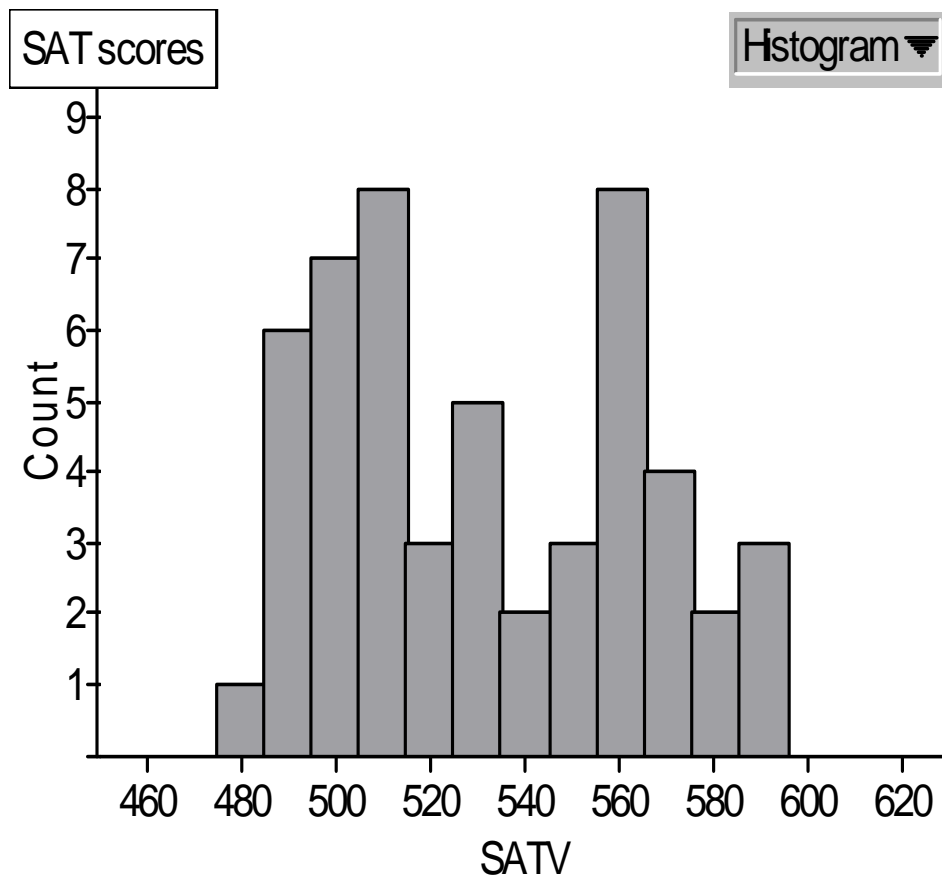
count ( )

# Describe the distributions



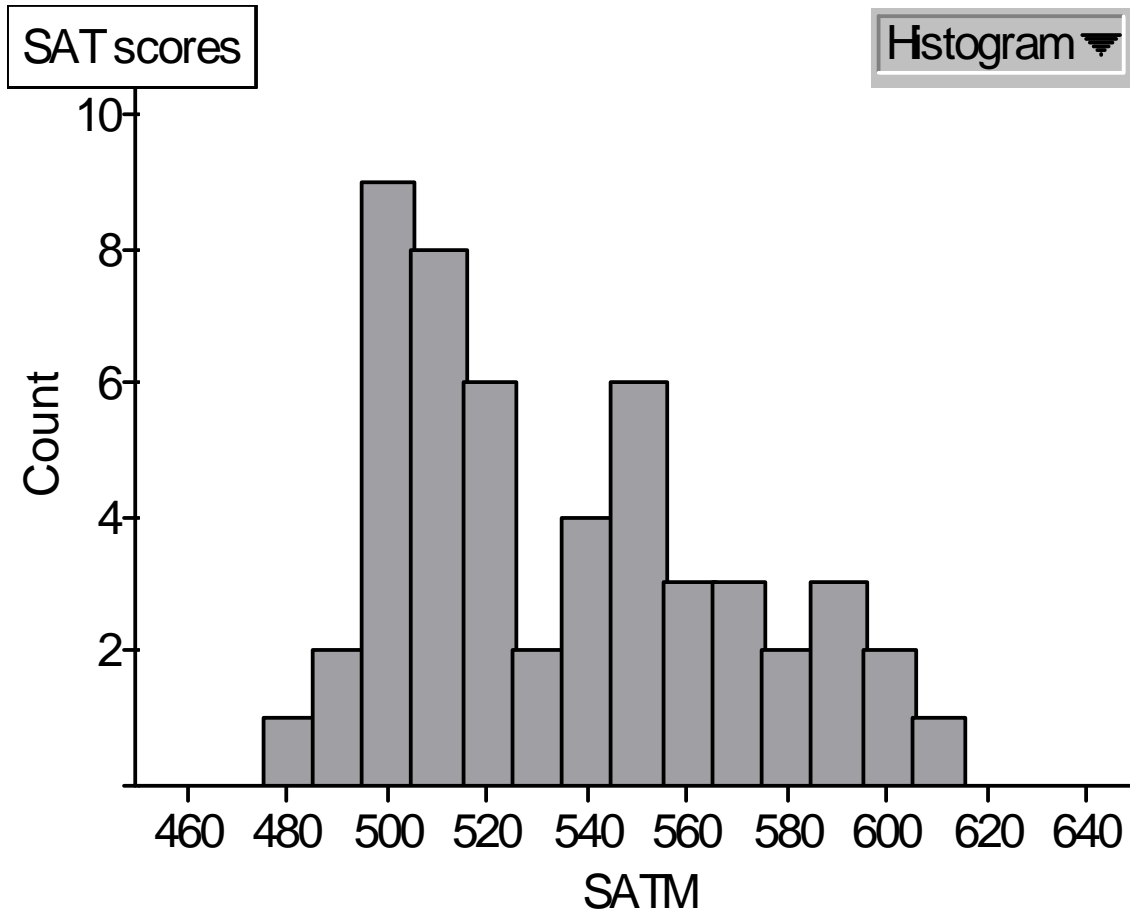
# Describe the distribution

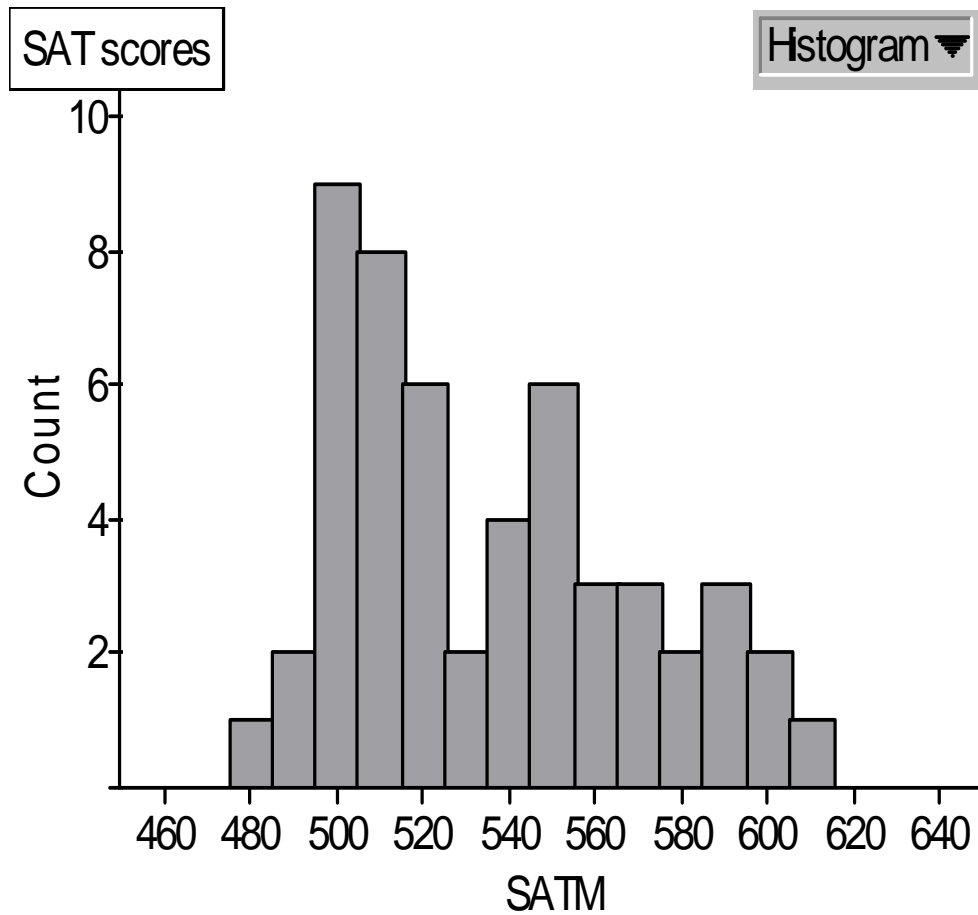




The data does not tail off to the right or tail off to the left. The distribution does not have any symmetry. The heights for the bars in the frequency histogram are not the same. So, the distribution is not rectangular/uniform, normal, skewed to the left, or skewed to the right. *If* the order of magnitude for the frequency is hundreds or thousands then we *might* have evidence sufficient to support a classification of bimodal.

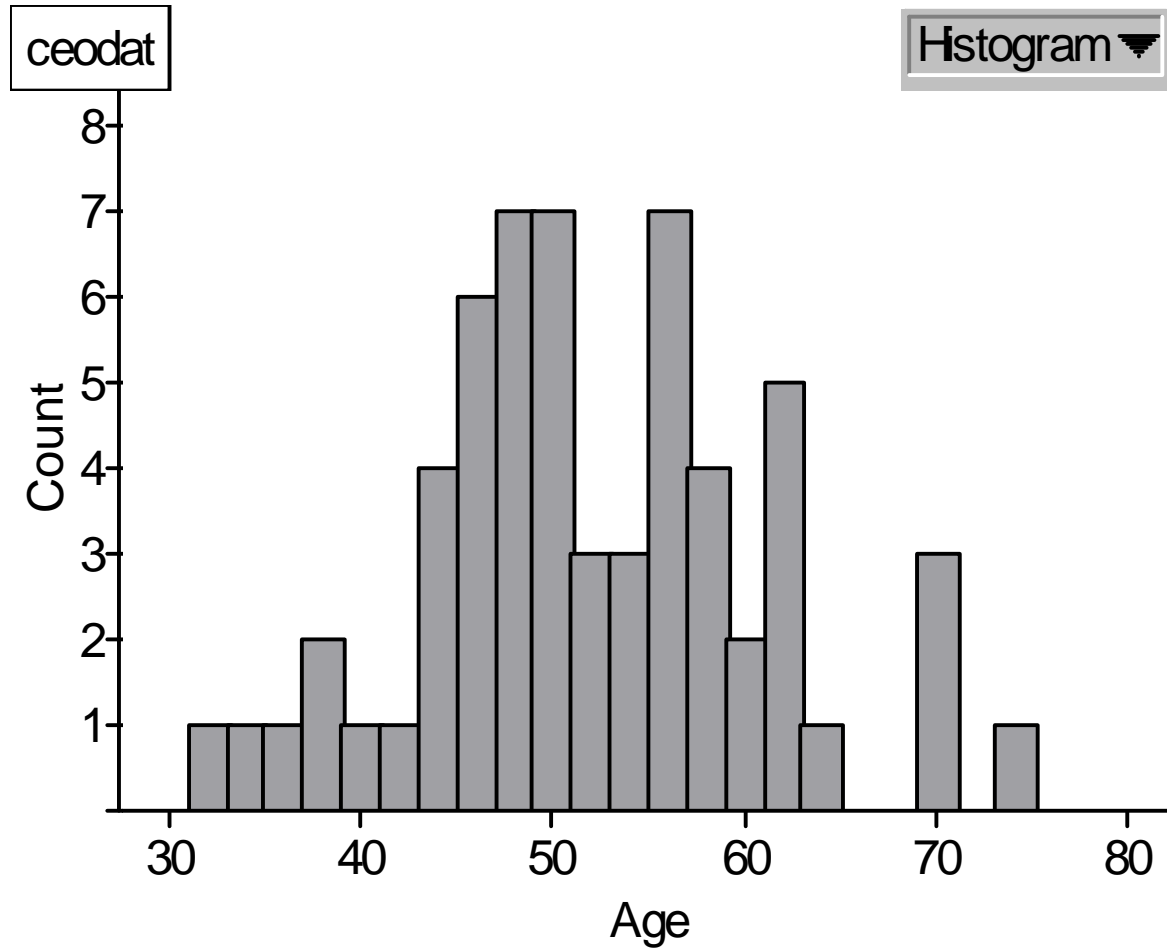
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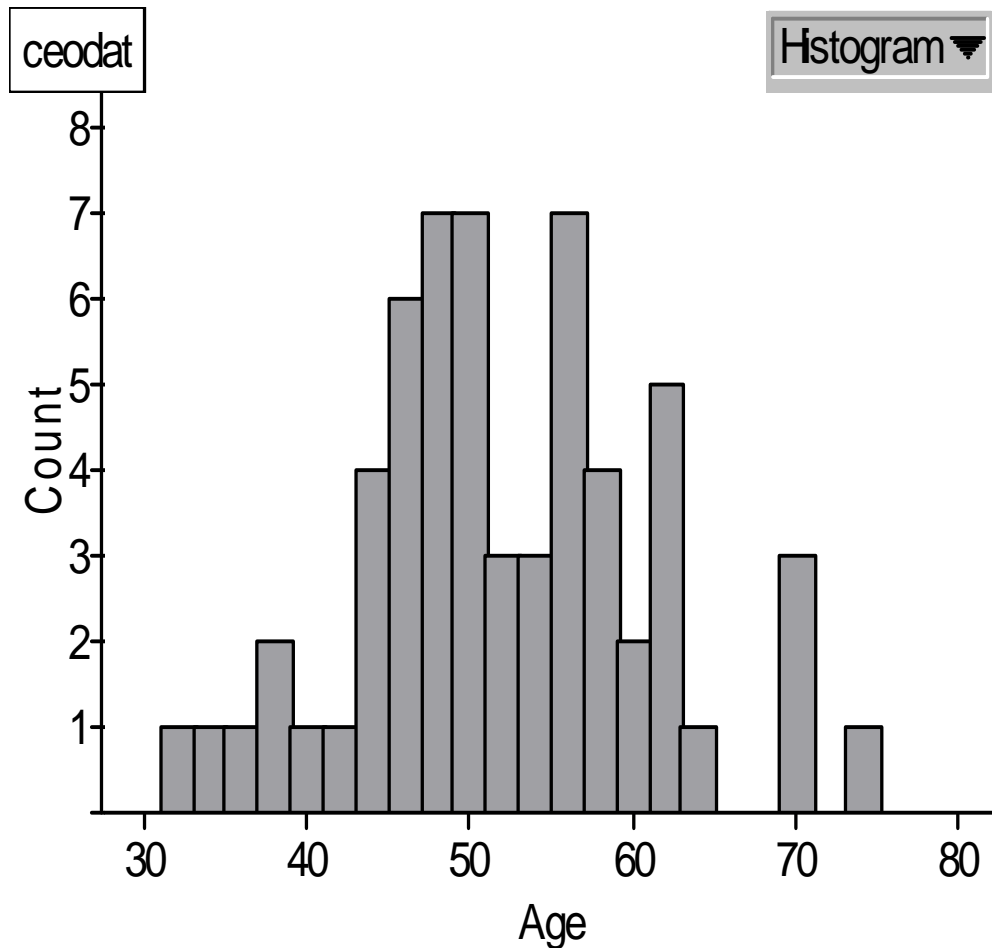




The data does not tail off to the right or tail off to the left; the frequencies are too low and too similar at the ends of the distribution. The distribution does not have any symmetry. The heights for the bars in the frequency histogram are not the same. So, the distribution is not rectangular/uniform, normal, skewed to the left, or skewed to the right. Even if the order of magnitude for the frequency is hundreds or thousands, the data would only pile up on the left.

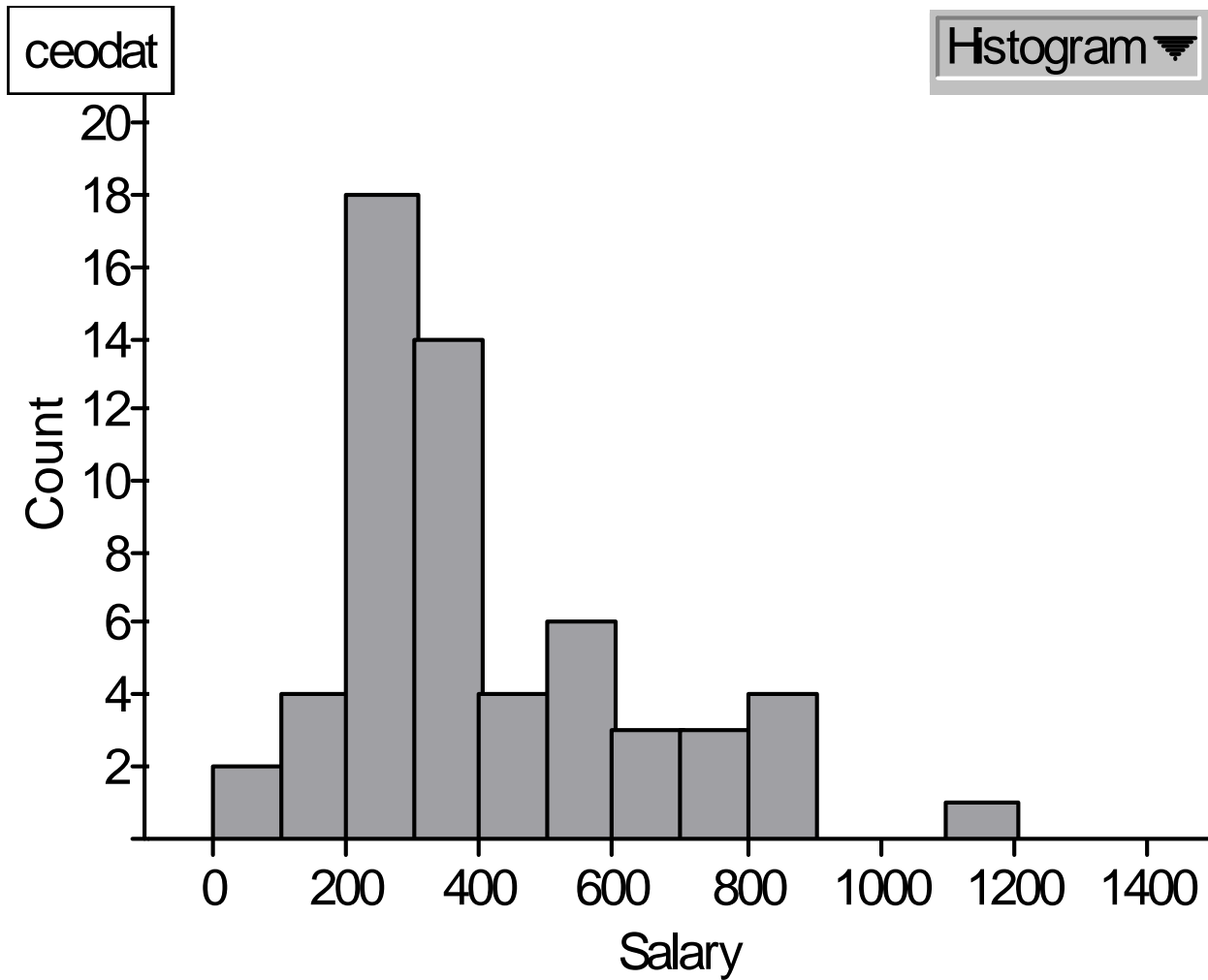
# Describe the distribution

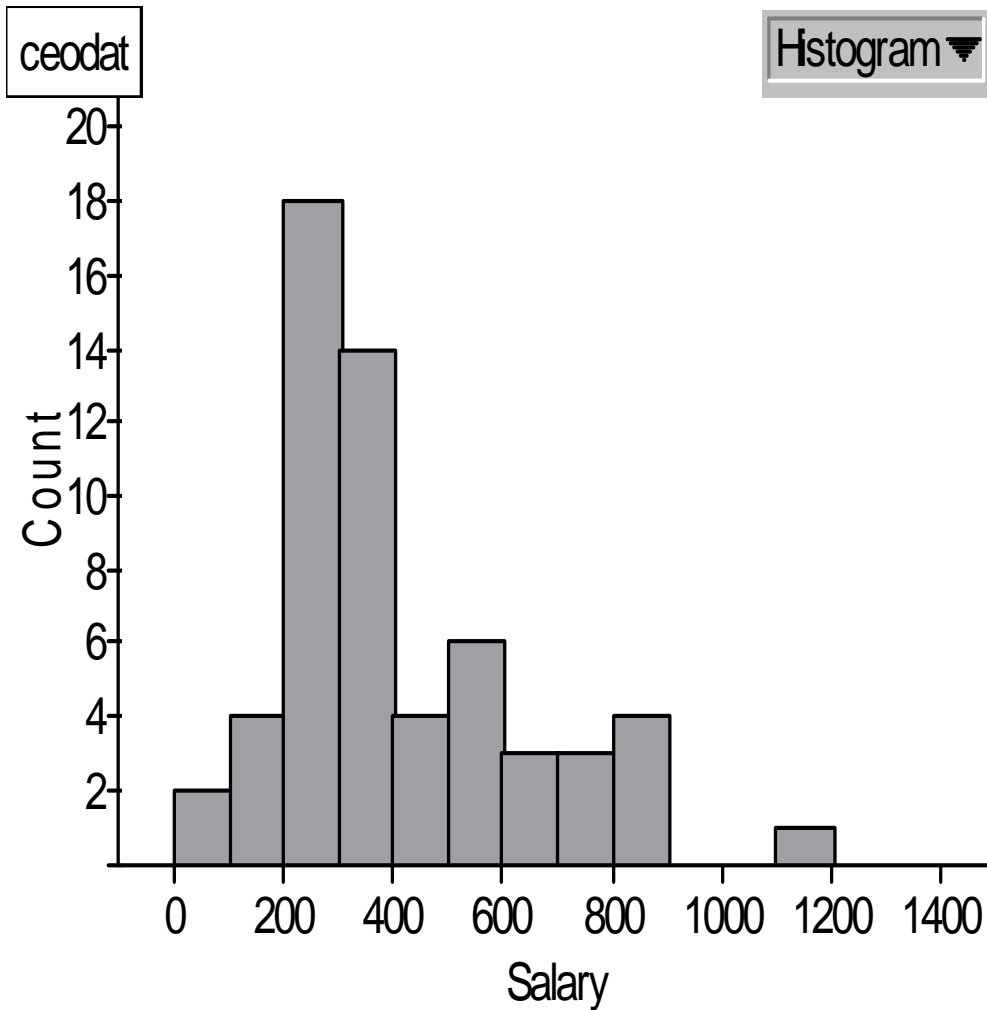




The data piles up at the middle and could be considered to tail off at the left and at the right. The heights of the bars of the histogram are not the same. Since a different class width would eliminate the what one might consider to be peaks in the distribution, we cannot classify the distribution as bimodal. We would classify the distribution as normal.

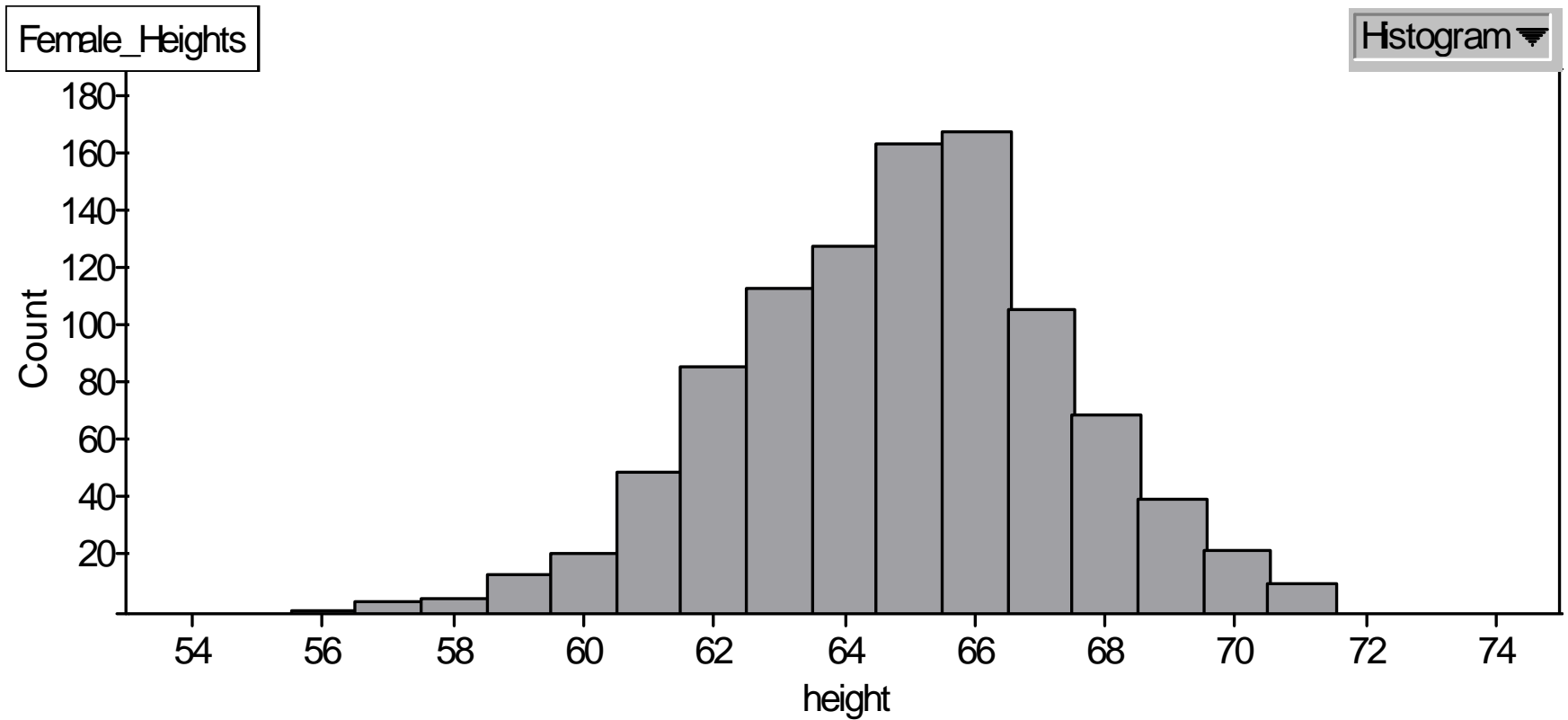
# Describe the distribution



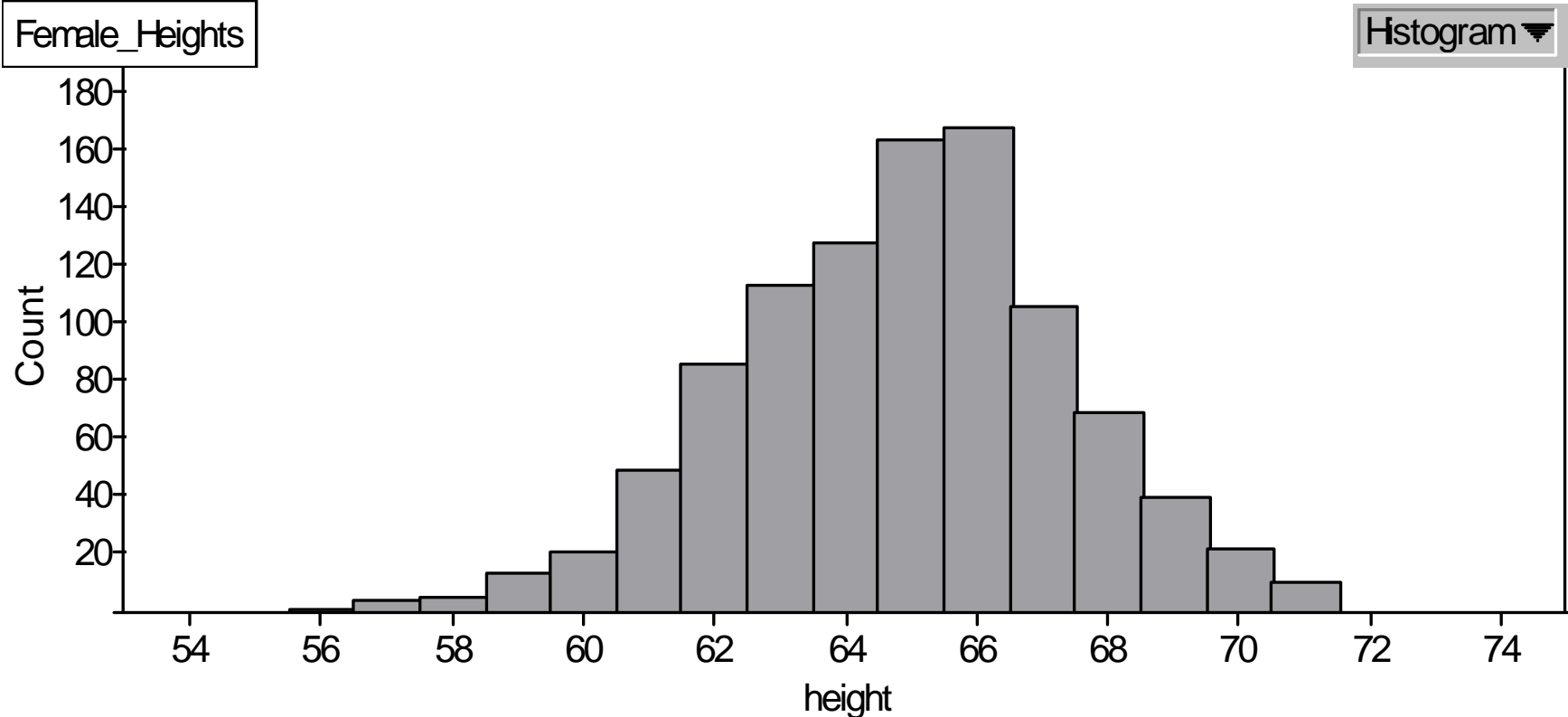


The data piles up on the left and tails off on the right. The distribution can be classified as skewed to the right.

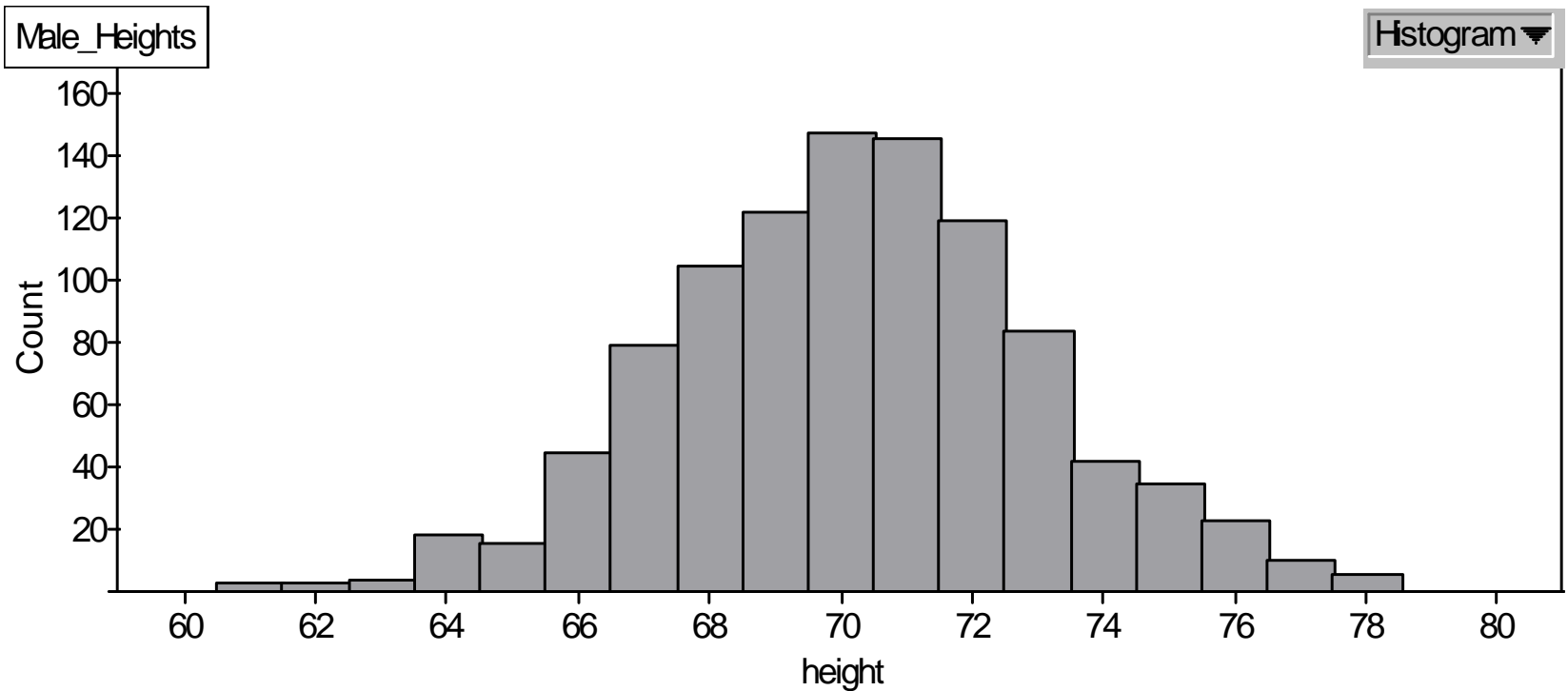
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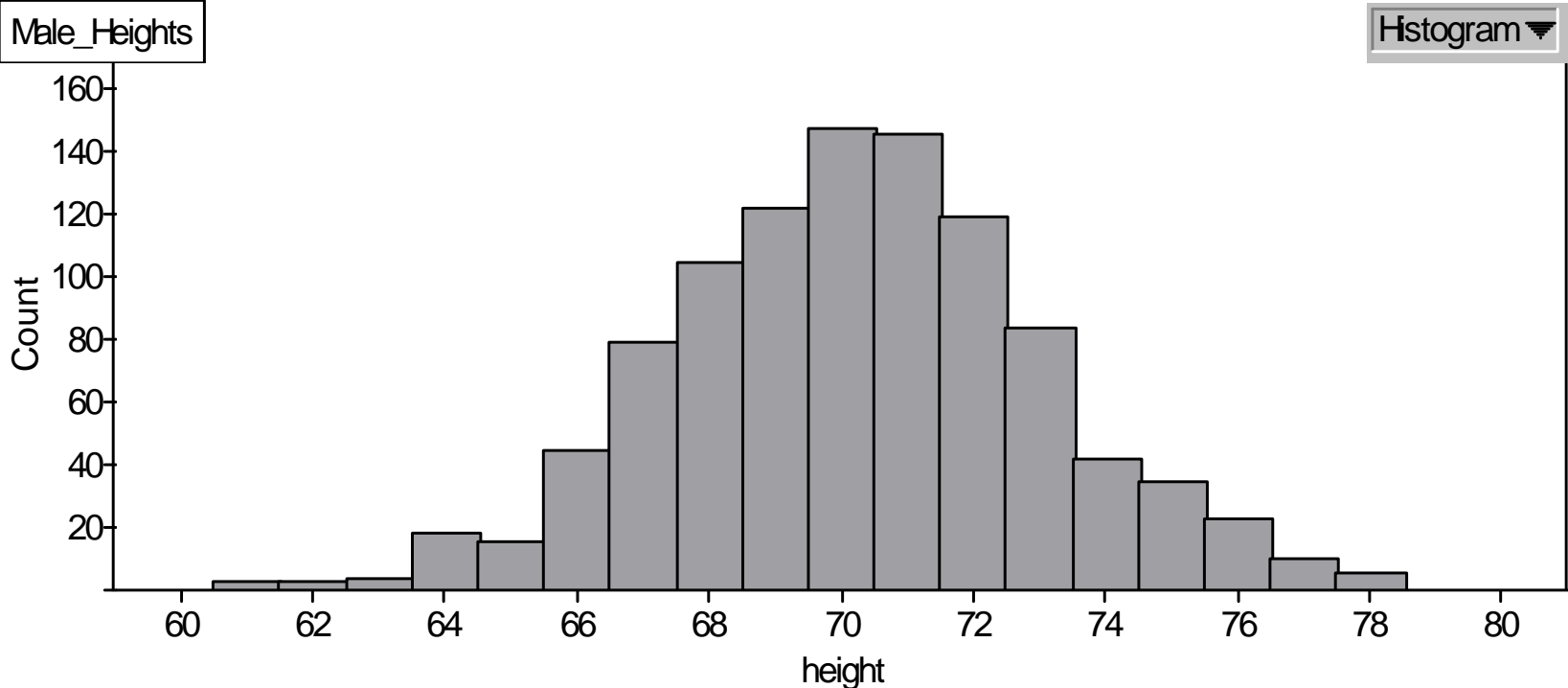
The data tails off on the right and on the left and the data piles up at the middle. The distribution can be classified as normal.



# Describe the distribution



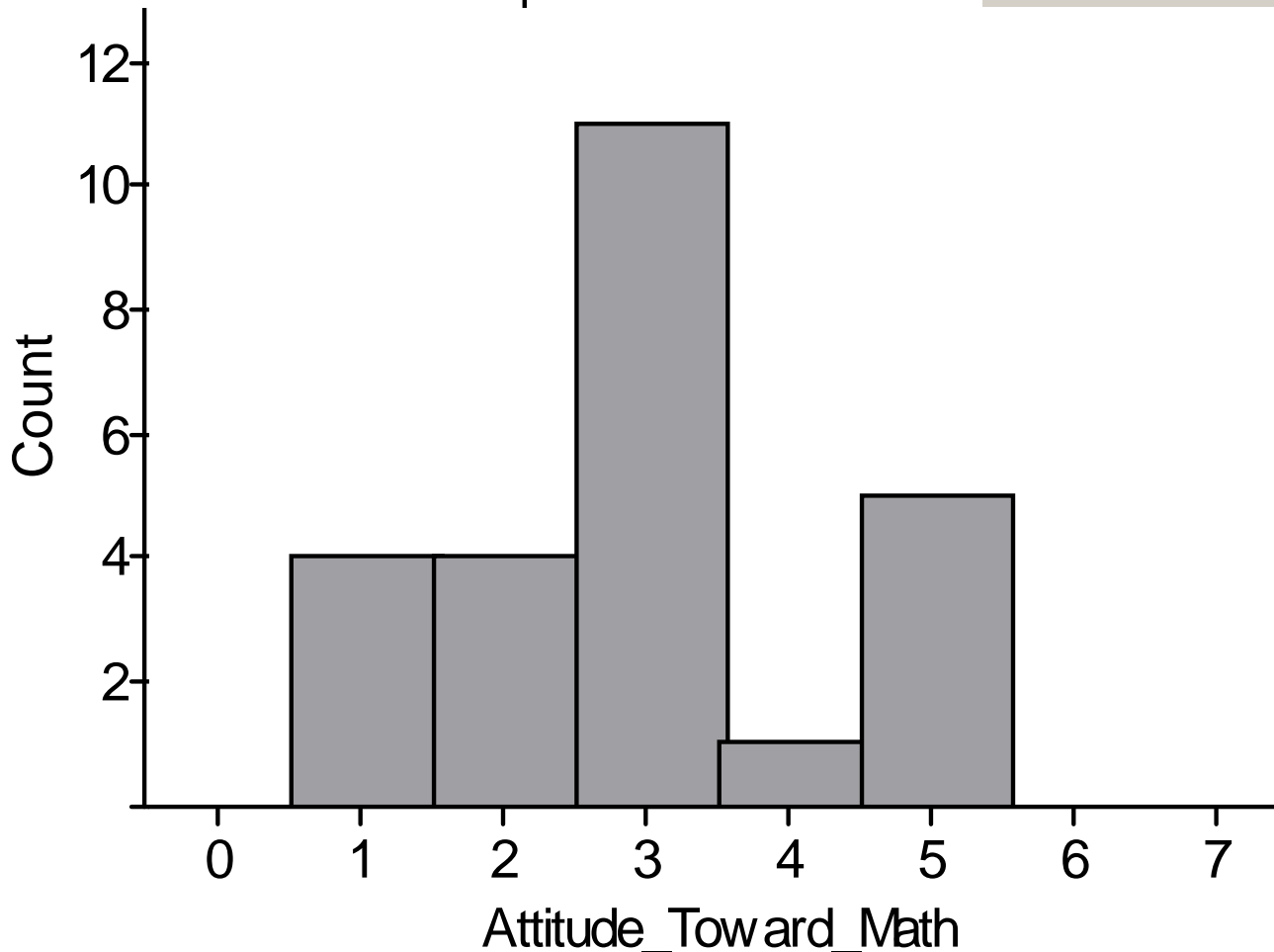
The data tails off on the right and on the left and the data piles up at the middle. The distribution can be classified as normal.

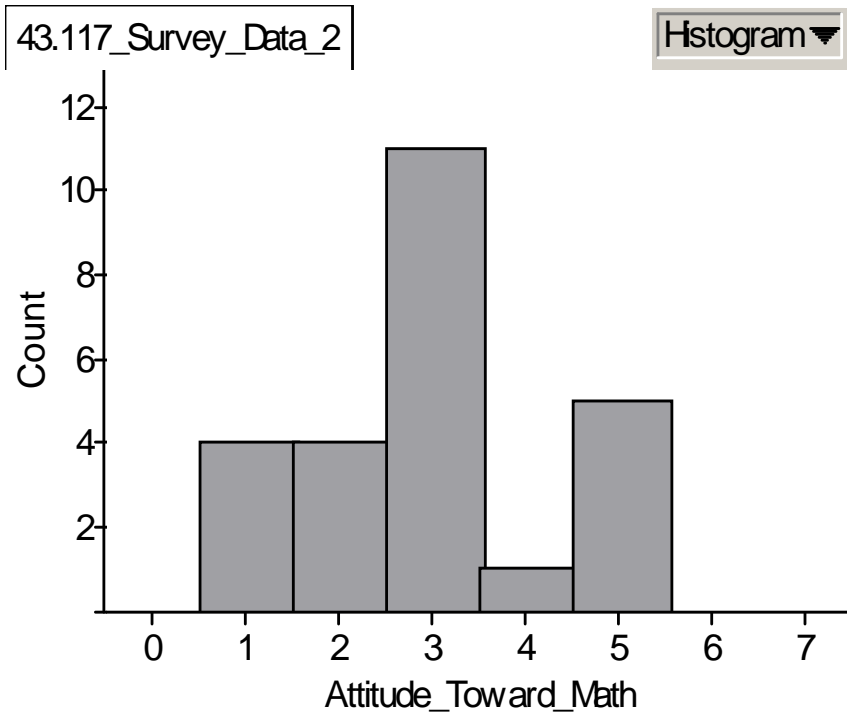


# Describe the distribution

43.117\_Survey\_Data\_2

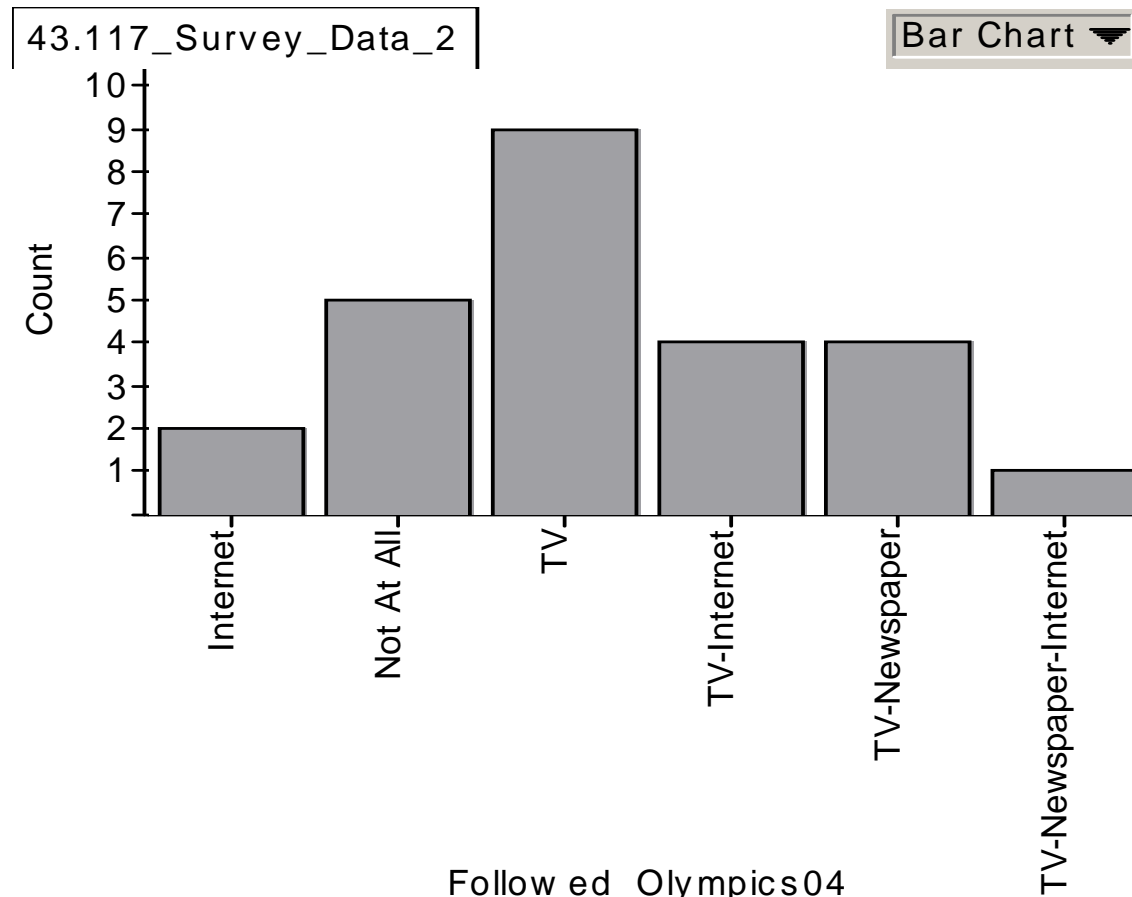
Histogram ▾





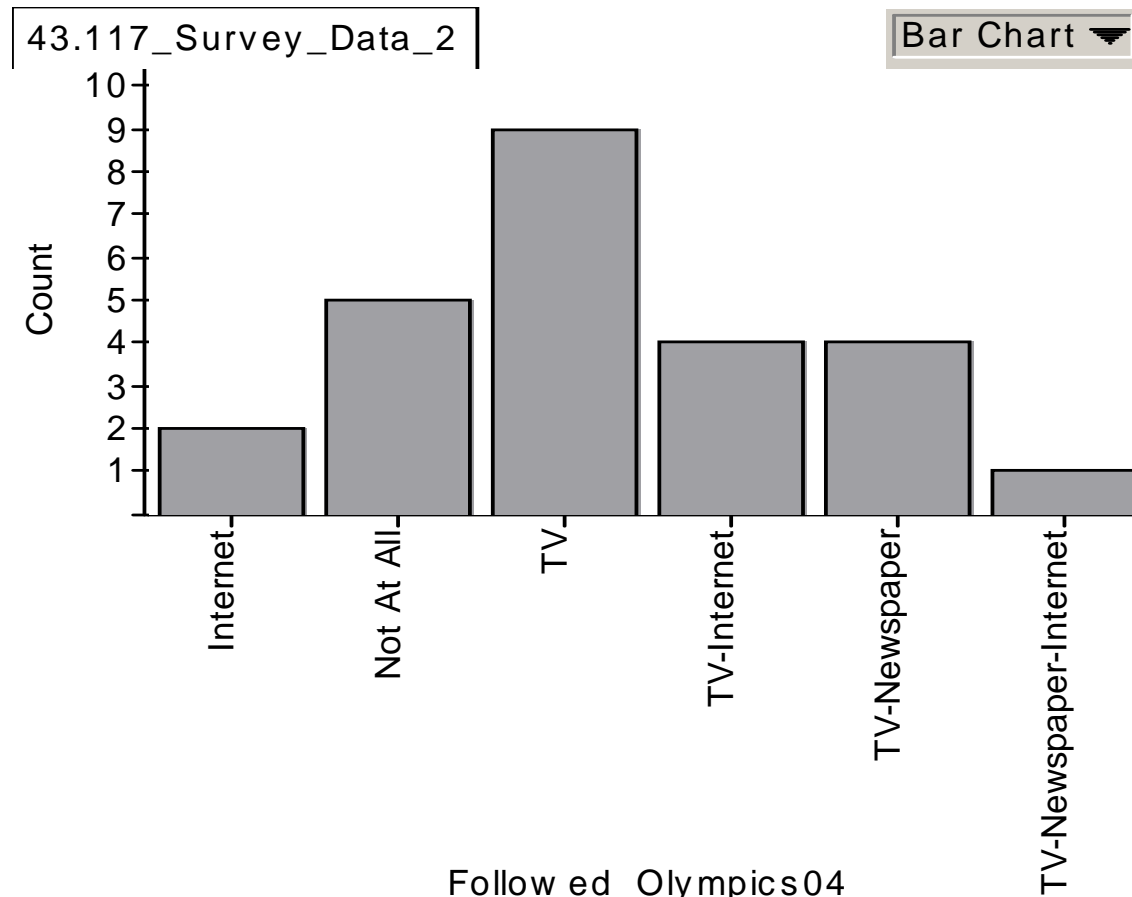
The data does not tail off the right or tail off to the left. Although the heights of the bars in the histogram are not the same, we must be careful to note that the frequencies are relatively small. So, we cannot classify the distribution as skewed to the left or skewed to the right. Since the distribution does not have multiple peaks, we cannot classify the distribution as bimodal or multimodal. At most, we can classify the distribution as rectangular, since the frequencies are relatively the same, or as normal since the frequency of the rating 3 has the greatest frequency and lies in the middle of the distribution.

# Discuss the graph below and, if possible, classify the distribution.



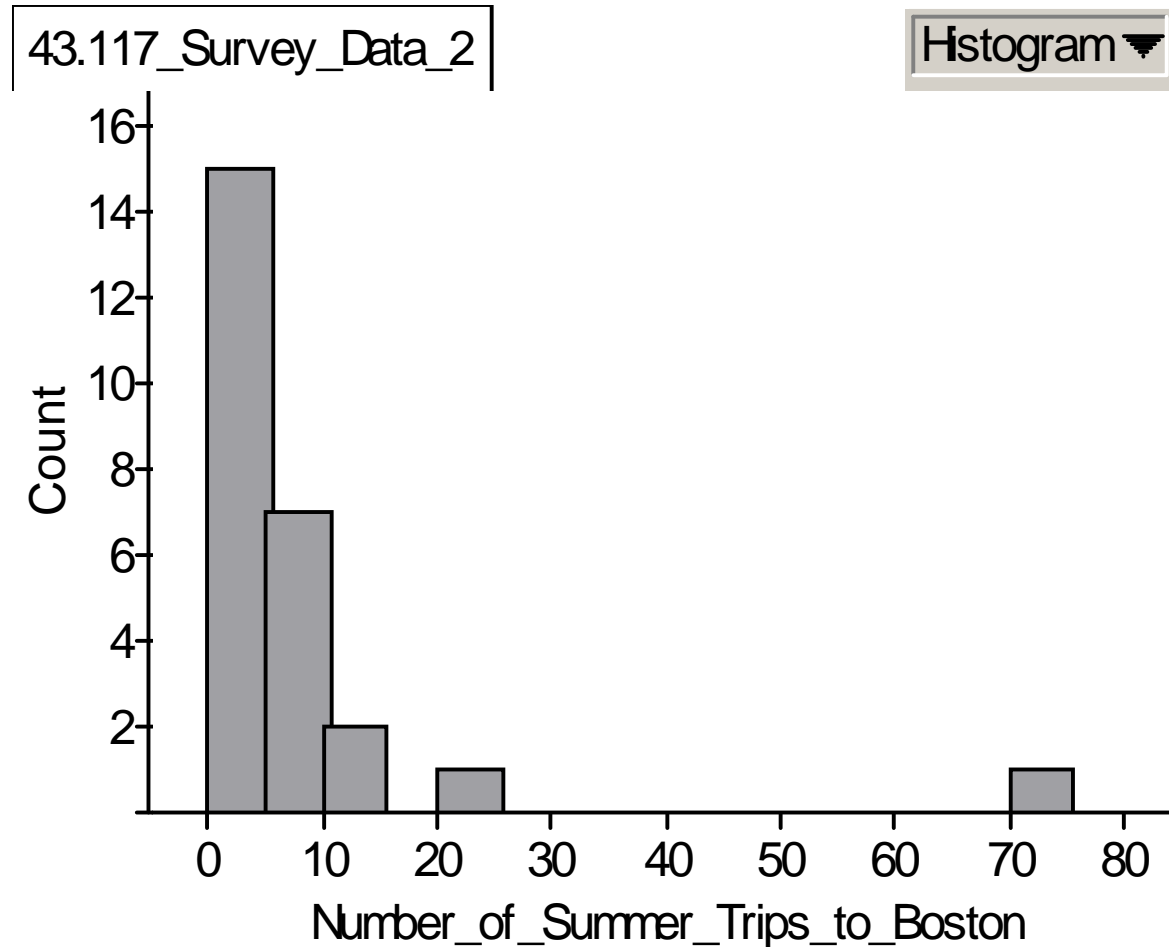
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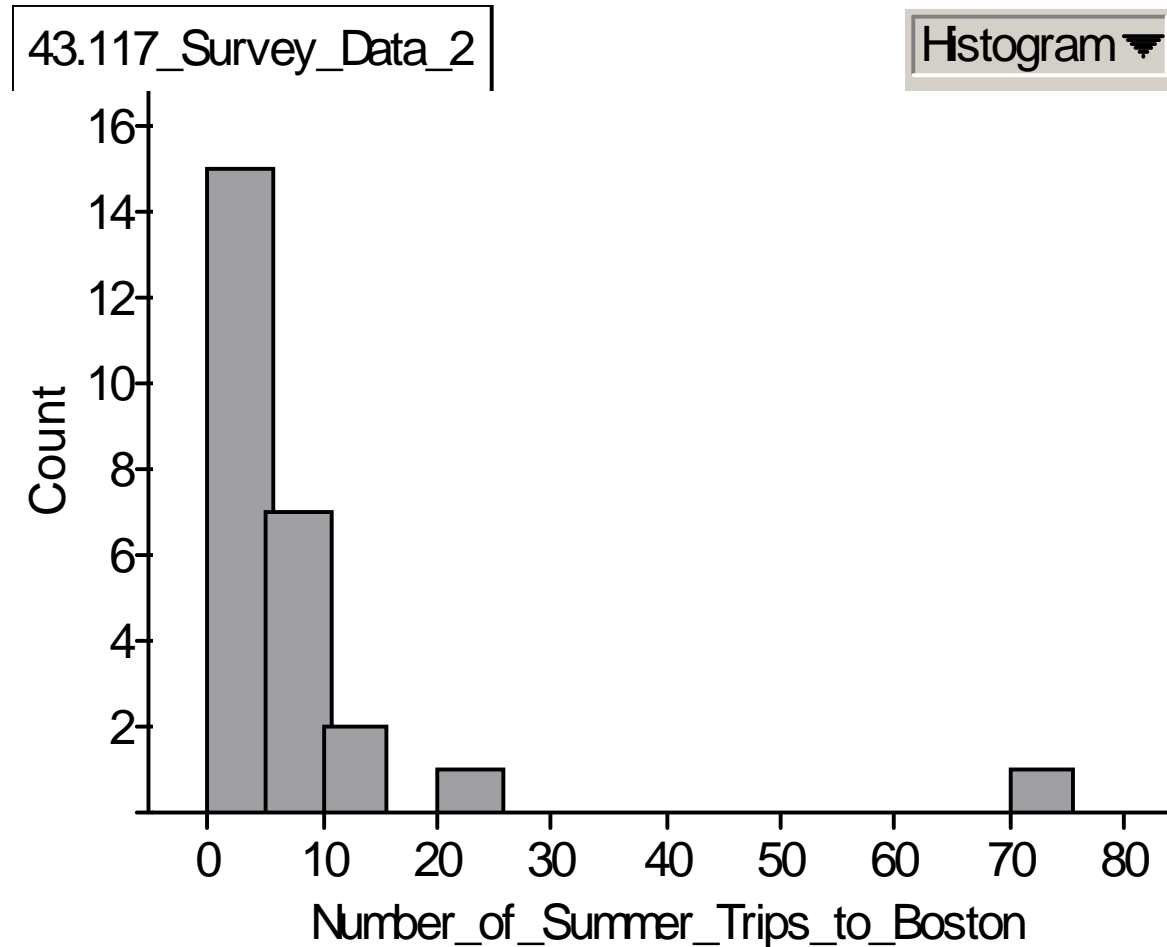


count ( )

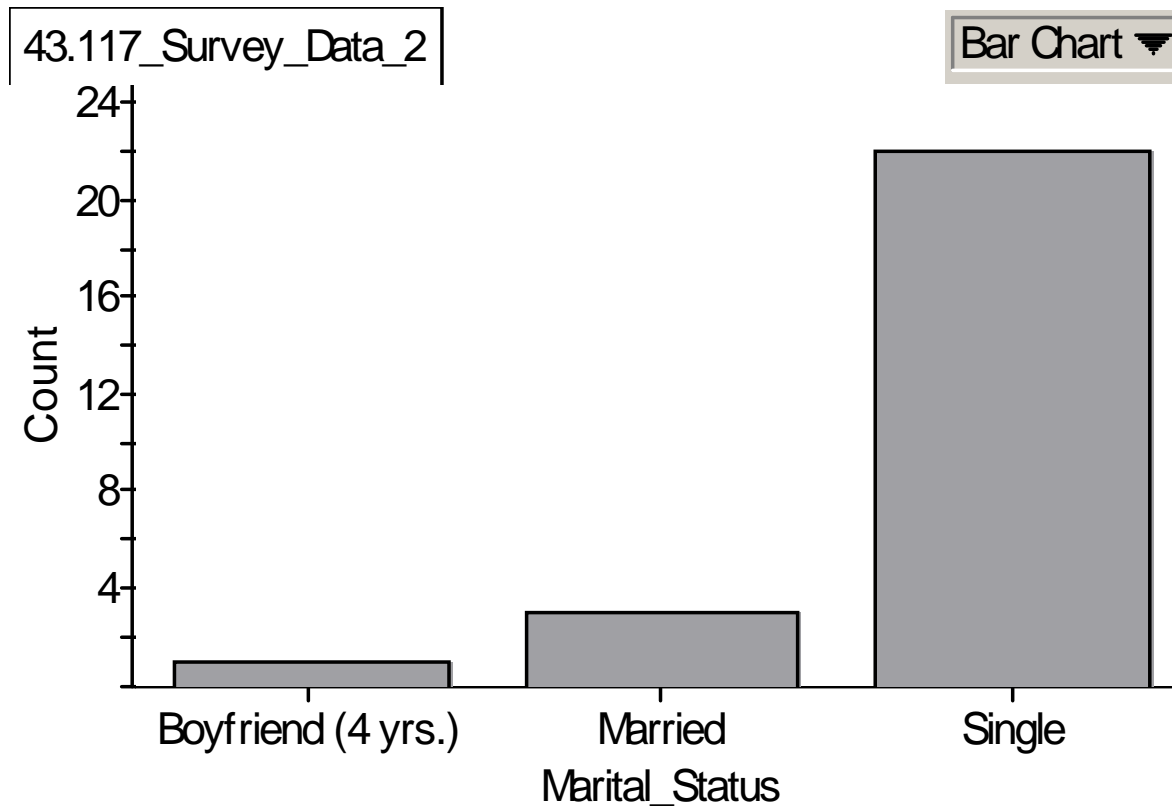
**Discuss the graph below and, if possible, classify the distribution.**



The data tails off to the right and piles up on the left.  
The distribution is skewed to the right.

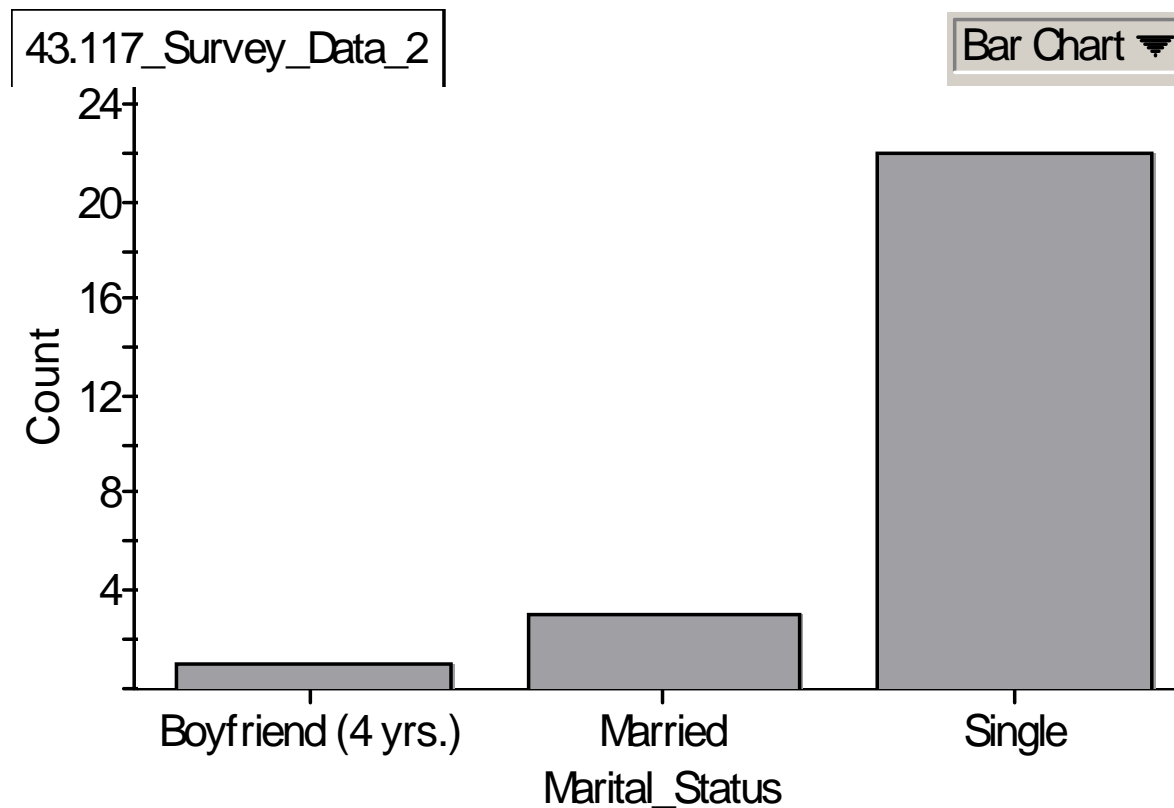


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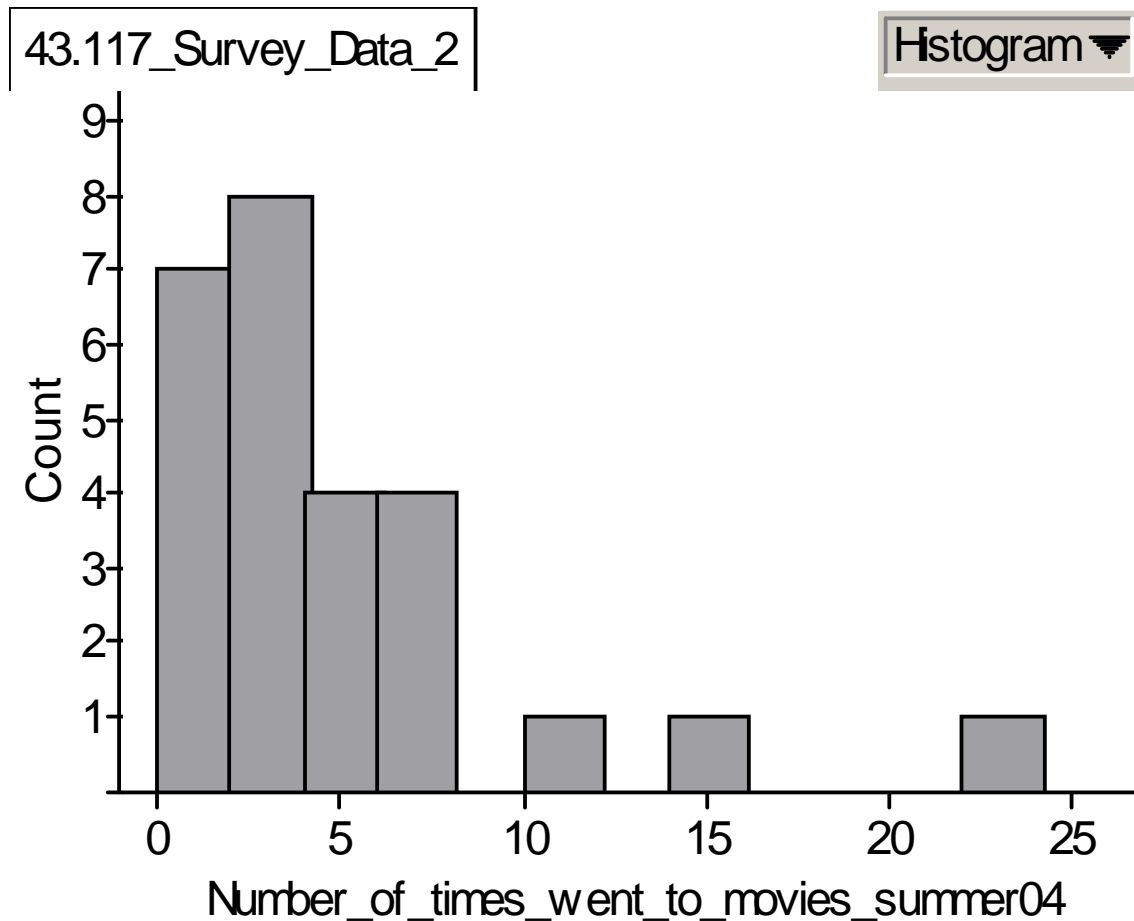
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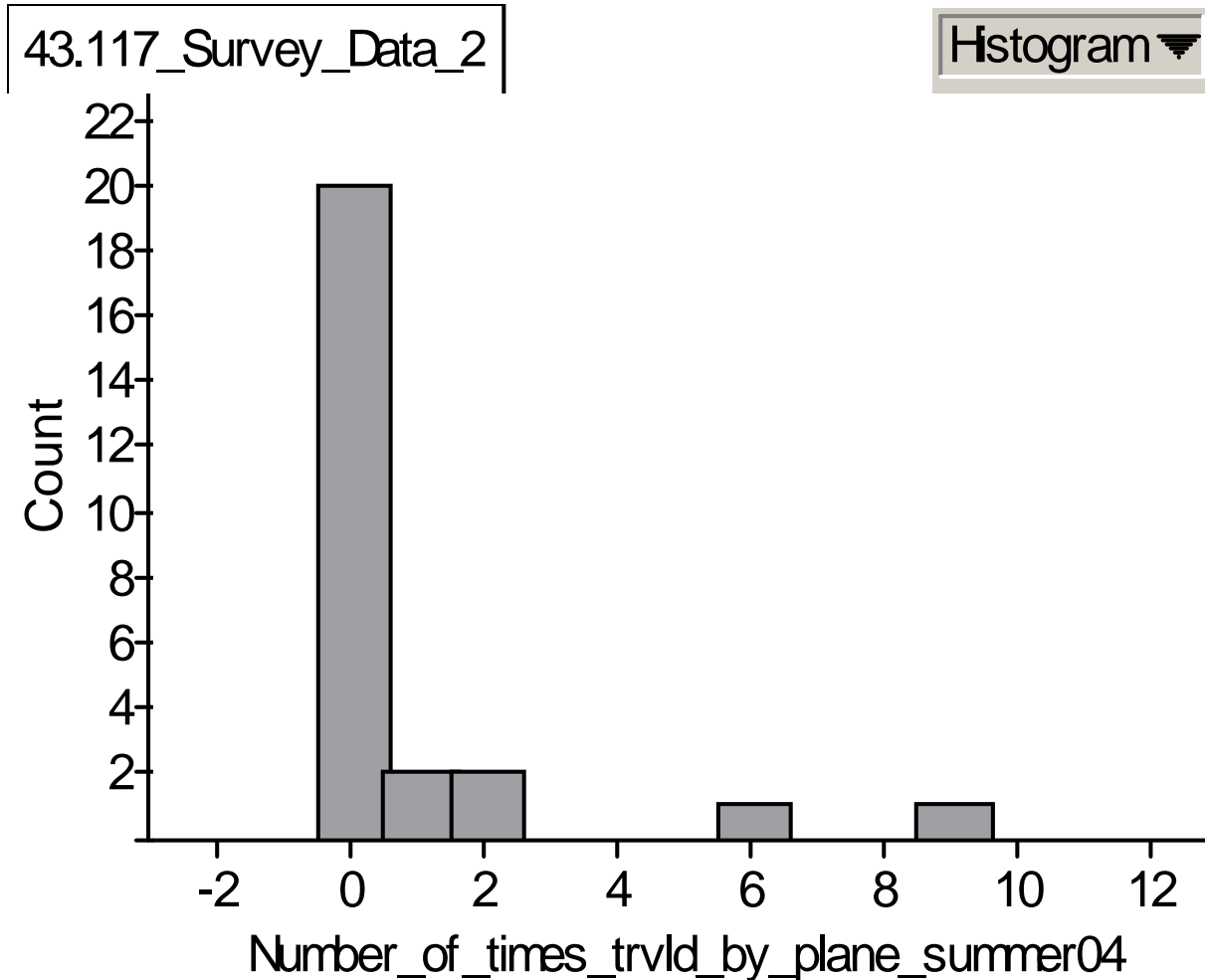


count ( )

**Discuss the graph below and, if possible, classify the distribution.**



# Describe the distribution



# Describe the distribution

