

What is the mean and median of any given histogram?

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April 24, 2024

RECOMMENDED CITATION

stats writer (2024). *What is the mean and median of any given histogram?*.

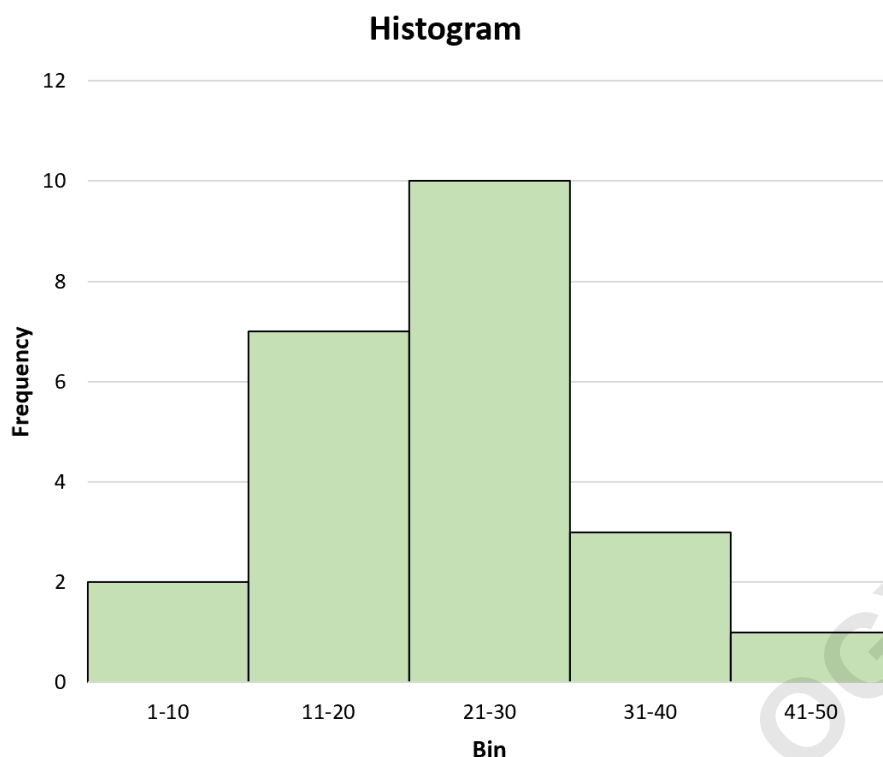
PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=138889>

The mean and median of a histogram are two important measures used to describe the central tendency of a set of data. The mean, also known as the average, is calculated by adding all the values in the data set and dividing by the number of values. It represents the balance point of the data and is heavily influenced by extreme values. The median, on the other hand, is the middle value in the data set when arranged in ascending or descending order. It is not affected by extreme values and gives a better representation of the typical value in the data set. In a histogram, the mean is represented by the center of the distribution and the median is represented by the point where the histogram is divided into two equal areas. Both the mean and median provide valuable information about the data and can be used to make inferences and comparisons.

Estimate the Mean and Median of Any Histogram

A histogram is a chart that helps us visualize the distribution of values in a dataset.

The x-axis of a histogram displays bins of data values and the y-axis tells us how many observations in a dataset fall in each bin.



Although histograms are useful for visualizing distributions, it's not always obvious what the mean and median values are just from looking at the histograms.

And while it's not possible to find the exact mean and median values of a distribution just from looking at a histogram, it's possible to estimate both values. This tutorial explains how to do so.

How to Estimate the Mean of a Histogram

We can use the following formula to find the best

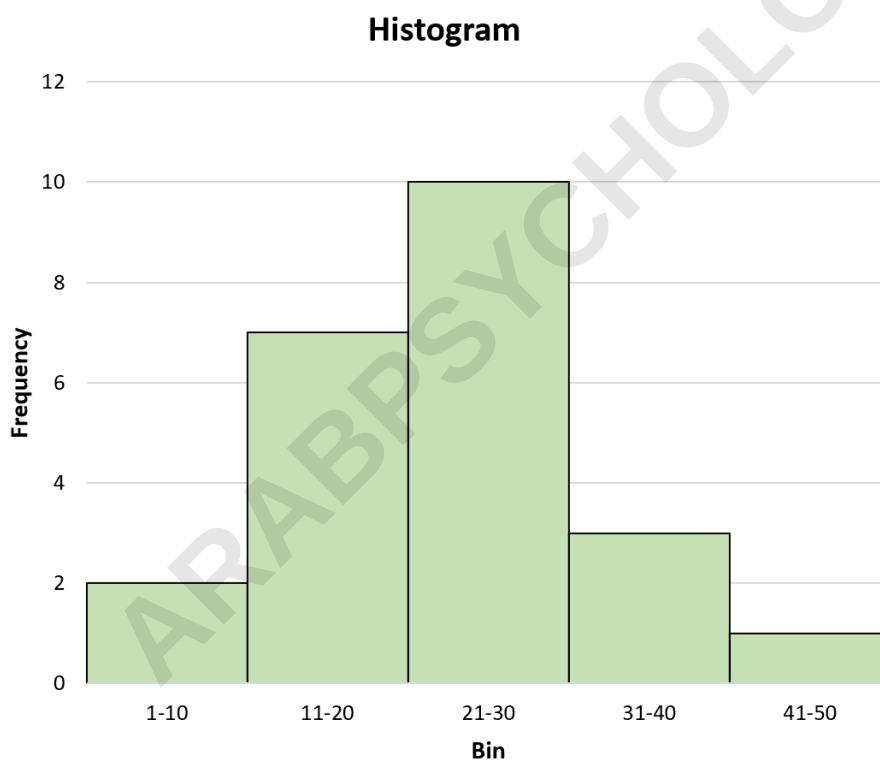
estimate of the mean of any histogram:

Best Estimate of Mean: $\sum m_i n_i / N$

where:

m_i : The of the i th binn
 n_i : The frequency of the i th bin
 N : The total sample size

For example, consider the following histogram:



Our best estimate of the mean would be:

$$\text{Mean} = (5.5 \cdot 2 + 15.5 \cdot 7 + 25.5 \cdot 10 + 35.5 \cdot 3 + 45.5 \cdot 1) / 23 =$$

22.89.

By looking at the histogram, this seems like a reasonable estimate of the mean.

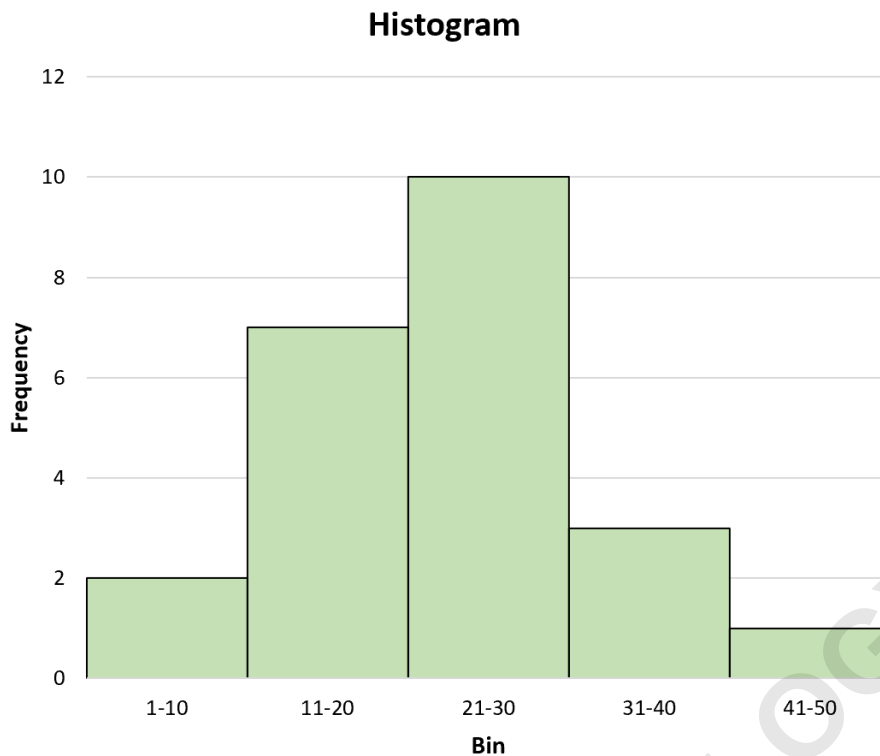
How to Estimate the Median of a Histogram

We can use the following formula to find the best estimate of the median of any histogram:

where:

**L: The lower limit of the median group
n: The total number of observations
F: The cumulative frequency up to the median group
f: The frequency of the median group
w: The width of the median group**

Once again, consider the following histogram:



Our best estimate of the median would be:

$$\text{Median} = 21 + \left(\frac{25/2 - 9}{10} \right) * 9 = 24.15.$$

From looking at the histogram, this also seems to be a reasonable estimate of the median.

How to Estimate the Standard Deviation of Any Histogram