

Stories Shape Can Tell

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Distributional Shape

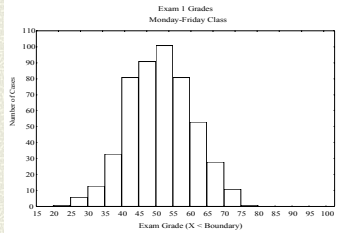
- # In earlier lectures, we defined and used a very useful, but somewhat idiosyncratic definition of the “shape of a list of numbers.”
- # More commonplace notions involve evaluating shape by plotting “value” on the horizontal axis and “frequency” on the vertical axis.

The Frequency Histogram

- # Perhaps the most common technique is to choose intervals, compute the number of cases that fall in each interval, and plot the resulting data, using bars to indicate the frequency. Such a plot is called a “frequency histogram”

The Frequency Histogram

Here is a typical example



Aspects of Shape

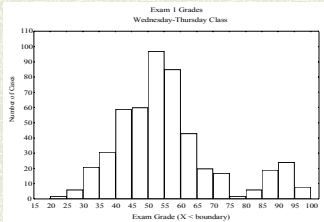
Distribution plots have a number of properties, discussed in some detail in textbooks. Among them are *symmetry*, *modality*, *skew*, and *kurtosis*.

Aspects of Shape

- Shape of your data is one of the first things you should examine.
- Look for *outliers*.
- Look for unexpected skew or bimodality.
- If you see something unusual, do not ignore it! Try to develop hypotheses, or stories, to explain what you see. Check out your hypotheses.

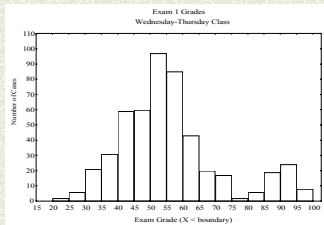
A Psychology 100 Distribution

- Once, I gave an exam and got a distribution like this. The distribution might be described loosely as bimodal.



A Psychology 100 Distribution

- Why might one obtain such a distribution in a Psychology 100 class? What do you see?



Rough Day at the Office

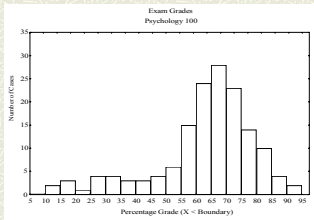
- One day, when I was beginning my career, I heard a knock on the door. I had just posted midyear exam grades in Psychology 100, and one of my students was standing in the doorway. His face was a sickly greenish-gray color. He was extremely upset about his grade.

Rough Day at the Office

✦ I had done something foolish (this was before the era of microcomputer data analysis). I had published the grades before examining their shape. With modern computing devices, there is seldom any excuse for not examining distributional shape.

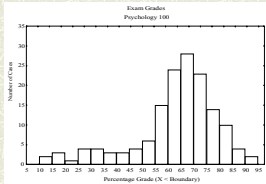
Rough Day at the Office

✦ If I had plotted the shape of the distribution, I would have seen something like this:



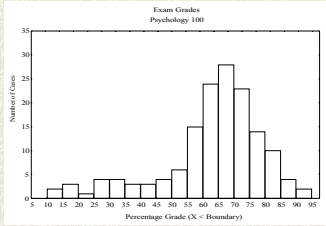
Rough Day at the Office

✦ By examining this distribution carefully, I might have discovered something interesting, and saved myself some embarrassment. The student's morning might have been better, too!



Rough Day at the Office

- Try developing some “stories” to explain this data pattern.

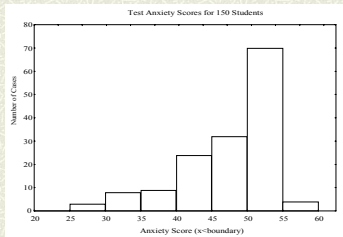


Up Against the Wall

- Suppose you developed a measure of test anxiety that involved listing a set of behaviors of increasing severity, having individuals rate whether these behaviors or experiences are typical for them, and adding up the number of positive responses.

Up Against the Wall

- Suppose during an early standardization attempt, you observed a distribution like this:



Up Against the Wall

What story does this distribution have to tell?

